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"What earthly pleasure can equal that of reading a good Book! O dearest Tomes! Princely and august Folio! Sublime Quarto! Elegant Octavo! Charming Duodecimo! Most ardently do I admire your beauties. To obtain ye, and to call ye mine, I would work both day and night."—Dr. Kitto.

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From the Author

13

# TREATISE

ON THE

# OLEUM JECORIS ASELLI,

OR

# COD LIVER OIL,

AS A

## THERAPEUTIC AGENT IN CERTAIN FORMS OF GOUT, RHEUMATISM, AND SCROFULA;

WITH CASES.

BY

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LONDON: S. HIGHLEY, FLEET STREET.
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DUBLIN: FANNIN AND CO.
1841.

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BALFOUR AND JACK PRINTERS, EDINBURGH.

TO

ROBERT CHRISTISON, M.D., F.R.S.E.,

PROFESSOR OF MATERIA MEDICA IN THE UNIVERSITY
OF EDINBURGH, &c. &c.

---

My dear Sir,

Let me beg you to accept this little Treatise as a mark of the respect I entertain for your profound acquaintance with the Materia Medica, and as a slight acknowledgment for the many personal kindnesses which I have experienced at your hands. If Therapeutics be the most difficult, so is it also the most important branch of our profession, and none can so well appreciate this as the physician who with high scientific attainments, unites practical tact and judgment in the treatment of disease. Nothing therefore would afford me greater satisfaction, than that this attempt to introduce a Continental remedy for the treatment of chronic rheumatism and scrofula, should be considered by you as in some degree useful.

Your most obliged Friend,

and former Pupil,

THE AUTHOR.

Edinburgh, *October* 1, 1841.

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# PREFACE.

THE extensive use of the oleum jecoris aselli (cod-liver oil) throughout Germany in cases of scrofula, and chronic gout and rheumatism, together with the encomiums bestowed upon it by several of the most talented and experienced physicians of that country, with whom I have conversed, induced me to fix my attention on its therapeutic properties. During an eighteen months' residence in various German states, therefore, I lost no opportunity of attending to cases in which the oil was administered, and consider myself entitled to say, that the result of personal observation has confirmed the favourable report I received respecting it. As I am not aware that it is prescribed to any extent in Great Britain, I have been induced to draw up the present Treatise, in the hope that by making known the researches

which have been instituted regarding it, and the good effects which have followed its administration, it may prove as successful in the hands of British, as it has already done in those of German practitioners.

Before entering into any details connected with this subject, however, I wish to impress upon the profession my general views regarding its value. It is not to be supposed capable of benefiting invariably any of the diseases for the cure of which it has been so much or even so extravagantly lauded; and I make this statement *in limine*, in order to prevent any exaggerated idea of its virtues that the facts and opinions hereafter to be detailed may induce others to form. There is no remedy which does not demand great practical tact for its successful administration; there is none which does not require great attention to the circumstances which indicate, as well as those which contradict its employment; and none, the action of which may not be increased or diminished by a judicious or injudicious conjunction of other remedial agents, as well as hygienic rules. To this therapeutic law, the oleum jecoris aselli is no exception, and it is not to be supposed that its indiscriminate exhibition in scrofula and rheumatism is



susceptible of curing or even alleviating those affections. If, on the other hand, it can be shown from well established facts, that this substance, though unable to supplant the remedies and modes of treatment now in use, is susceptible, under particular circumstances, of forming a valuable addition to our means of cure; I hope to be exonerated from having lightly or unnecessarily directed the attention of the profession to the therapeutic properties attributed to it.

The literature connected with this subject is for the most part scattered among the forty German medical periodicals which issue from the press, the access to some of which even is by no means easy. Without the aid of several of my medical colleagues in Germany, therefore, it would not have been possible for me to have collected the materials for the composition of this Treatise. Many of these gentlemen also have kindly allowed me to visit their patients, and make observations for myself, and all were ready to communicate such facts and particulars as might serve the object I had in view. I seize this opportunity, therefore, of acknowledging my obligations, and returning my most sincere thanks to Professor NAEGELE, and Drs NEBEL, STEINHEUSER,

ABENDHEIMER, KOBELT, and HERRGHT of Heidelberg, Professor RINEKER of Wurzburgh, Dr FRECH of Baden Baden, Dr CLESS of Stuttgard, Dr KRUKENBERG of Halle, Professors DIEFFENBACH, BAREZ, and ROMBERG, and Drs HILDEBRAND, ZITFACH, DOMMES and FÜRSTENBERG of Berlin, and Dr GRUBY of Vienna.

I feel much indebted also to Dr EDMONSTON of Shetland, who has kindly communicated to me the mode by which the oil is procured in that island, and the degree of success which has attended his administration of it.

J. H. BENNETT.

EDINBURGH, *October* 1, 1841.

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ERRATA.

P. 13, line 14, for *aselli*, read asellí.
15, line 23, for *pharmacopeias*, read pharmacopœias.
39, line 10, for *empyreuma*, read empyreuma.
40, line 4, for *makes* read make.
43, line 1, for *bal. copaiba*, read bal. copaibæ.
53, line 7, for *science*, read sciences.
57, line 26, for *Archerson*, read Ascherson.
60, line 1, for *Archerson*, read Ascherson.
75, line 26, for *Liberthran*, read Leberthran.
119, line 13, for *Cazarthrocacæ*, read Coxarthrocaceæ.
133, line 20, for *stethescope*, read stethoscope.
139, line 19, for *stethescope*, read stethoscope.
139, line 21, for *paterciloquy*, read pectoriloquy.
143, line 17, for *bath*, read baths.
180, line 18, for *iodine*, read iodide.

# HISTORICAL INTRODUCTION.

THE Cod liver oil[1] appears to have been used immemorially as a popular remedy for the cure of rheumatism in various countries. In Sweden and Norway the reputation of its virtues was widely spread, and from thence it seems to have found its way into Germany. There its employment became very general, especially among the inhabitants of the northern and western coasts of that country, the provinces which border on the Rhine, and throughout Suabia and Westphalia.[2] In Holland it had obtained a great reputation for the cure of rachitis long before its remedial properties were acknowledged by medical men. It has been used also as a popular medicine in Great

[1] SYNONYMES.—Oleum Jecoris Aselli, Oleum Morrhuæ, *Latin:* Cod liver oil, *English:* Huile de Morue, Huile de Foie de Poisson, *French:* Leberthran, Stockfisch Leberthran, Gichtthran, Leberthran, Bergerthran, *German.* The last name is derived from Bergen, in Norway, where a society of merchants of the three Hanseatic towns, Hamburg, Bremen, and Lubeck, possess a large establishment, which distributes every year, more especially throughout Germany, the bodies and oil of about twelve millions of cod fish.

[2] With a view of shewing the great reputation which this remedy enjoys among the Rhinelanders, even in the present day, I may mention a circumstance communicated to me by Professor Naegele, of Heidelberg. During a period of seven years that he practised at Dusseldorf, no peasant ever applied to him, whatever was his

Britain; for, according to Dr Barton,[1] the Oleum Scatinæ or Raiæ was applied to ricketty children in the north of Scotland, and I have heard, from various sources, that Cod liver oil is still employed there by the people for the cure of rheumatism. I have myself ascertained, for instance, that among the fishing population of Newhaven, near Edinburgh, a very general opinion prevails that the Cod liver is very medicinal and strengthening, and that the oil extracted from it is very beneficial in "old pains." Doctors Percival[2], Darbey,[3] and Bardsley,[4] also state that it has a great reputation throughout Lancashire for the cure of rheumatism, and Dr Hull[5] mentions that it was taken with advantage by a woman labouring under malacosteon, at Ashton-under-Line.

Mr Darbey informs us, (1789) that Dr Kay, one of the physicians to the Manchester infirmary, was the first medical man who prescribed it for the cure of disease. Its success in removing rheumatism was so great in his practice, as well as in that of the other physicians of the infirmary, that the institution dispensed fifty or sixty gallons of the oil annually.

complaint, without having previously tried the Cod liver oil. It is their universal practice, when ill, first to take the oil, and if it fails, then, and not till then, to ask a medical man for advice.

[1] Diss. Inaug. Edinb. De Rachitide, p. 44.

[2] Percival's Medical Essays. Warrington, 4th edition, p. 354.

[3] Idem. p. 359.

[4] Medical Reports. London, 1807, p. 20.

[5] Translation of Baudelocque's Memoirs on the Cæsarian operation. Manchester, 1801, p. 159.



Dr Bardsley, in his medical reports, (1807) remarks, "this medicine has preserved its reputation in our infirmary unimpaired, during the period of thirty years, for I find its annual consumption to have been from fifty to sixty gallons soon after its introduction in 1766; and the quantity dispensed for many years back has seldom fallen below the above amount; the last year it exceeded forty gallons."

The next writer who spoke of the Cod liver oil was Dr Schenk of Siegen. In 1822 he published a memoir on this subject in Hufeland's Journal, and gave a series of very obstinate cases of rheumatism, in which its use was followed by the best effects. This was succeeded, four years later, by another memoir in the same journal, where not only several cases of lingering rheumatism, but of rachitis also, were described as having been completely cured by the oil.

Since then the employment of this remedy in Germany has been very extensive; numerous cases and memoirs, hereafter to be noticed, have been published in the different journals of that country; and its utility is now so well established, that it has obtained a place in the pharmacopeias of Prussia, Hanover, Saxony, Sleswig, and Holsatia.

Of late years it has also been used medicinally in France and Belgium; and the observations and

memoirs of Reister,[1] Carron du Villards,[2] Taufflied,[3] Gouzée,[4] Delcour,[5] and others, have confirmed the reputation it had previously acquired in Germany. In England, so far as I am aware, it does not appear to have attracted much attention from medical men. Dr Edmonston of Shetland, however, in a private communication to which I shall afterwards have occasion to allude, informs me that he has extensively used it in his practice with great success, and I have learned from Dr A. T. Thomson, of London, that on reading Dr Bardsley's notice of it in the medical reports, he gave it to several patients, but discontinued it on account of the eruptions which it appeared to produce on the skin. Dr Marshall Hall, also, has published a note on its beneficial action in chronic skin diseases:[6] Dr Donovan, of Dublin, has pointed out a new way of preparing it,[7] and it has for several years been noticed by Professor Christison, of Edinburgh, in his lectures on Materia Medica.

[1] Journal des Progres, &c., tome 2, 2 me., Series.
[2] Bulletin de Therapeutique. 1834.
[3] Gaz. Méd. de Paris. 1827, p. 503.
[4] Annal da Med. Belg. 1838, t. 1. p. 6.
[5] Gazette des Hospitaux. 1841, Mai.
[6] Medical Gazette, vol. 10, p. 796.
[7] Dublin Journal, No. 51.



## SECTION I.

### OF THE NATURAL AND COMMERCIAL HISTORY OF THE COD LIVER OIL, AND OF THE METHODS BY WHICH IT IS PREPARED.

The Oleum Jecoris Aselli is obtained from several species of Gadus, belonging in the classification of fishes to the order *Malacopterygii thoracici*. Thus it has been procured from the Cod fish, (*Gadus Asellus*, also called *Asellus major*, and *Gadus Morhua*); the Dorse, (*Gadus Callarias*); the Coal fish, (*Gadus Carbonarius*); the Burbot, (*Gadus Lota*); the Ling, (*Gadus Molva*); and the Torsk, (*Gadus Brosme*).

All these different species may be known by the following generic characters. Body elongated, smooth, compressed towards the tail; back furnished with three dorsal fins; ventral fins pointed; abdominal line with two fins behind the anal aperture; the lower jaw with one barbule at the chin; branchiotegous rays, seven, *(Yarrell)*.

The particular species from which the oil used in commerce is more especially obtained, is not yet determined, as the different authors who have written on this subject are by no means agreed. Duhl states in his additions to the latest Prussian Pharmacopœia, that it is procured from the liver of the Cod fish.

According to the account of Geiger[1] on the other hand, the oil is obtained from the liver of the Dorse. Spearman, and after him Berzelius,[2] attribute it to the liver of the Scythe, or Coal fish. Buchner says[3] that it is also procured from the liver of the Burbot. Kopp[4] refers it, in conjunction with that of other kinds of Gadus, to the liver of the Ling, and Dr Edmonston informs me it is also obtained from the Torsk. The opinion generally entertained at present is, that in the large fisheries, the oil is obtained from the livers of a greater or less number of the different kinds of fish above-named, which are thrown together indiscriminately for that purpose.

The Cod and most of these fish are found in the temperate seas between the 40th and 60th degree of north latitude. Thus on the coasts of Greenland, Norway, Denmark, north of Germany, Holland, Sweden, north and east of Great Britain, but more especially off the banks of Newfoundland, they are found in great quantities. Nine millions of ova have been found in the roe of one Cod fish, so that it will not excite surprise that their capture employs whole fleets, and is a source of great mercantile wealth. We are ignorant, however, whether the oil used for medical purposes is principally derived from one

[1] Magazin für Pharmazie. 1826, August, p. 101.
[2] Lehrbuch der Thier Chemie. 1831.
[3] Repertorium der Pharmazie. Bd. 29, 2te. Heft.
[4] Denkwurdigk, in der arztl, Praxis. Bd. 3.



particular kind of fish, or from the combination of several. Numerous facts indicate that in different countries different oils are prepared, and it is reasonable to suppose that this difference may, in some degree, depend upon the greater or less comparative quantity of the various species of fish found on particular coasts.

In commerce, several kinds of Cod liver oil are to be met with, which are not only distinguishable from one another by colour, smell, and taste, but possess also no inconsiderable difference in chemical composition. All the different specimens, however, may be separated into two kinds, one of which is more or less of a yellow colour and transparent, and the other more or less brown and opaque. The first of these kinds is more generally used in medicine, and the latter in the arts, more especially by tanners in the preparation of leather.

I have frequently found a discrepancy between the verbal statements of practitioners, and what has been written on this subject. On asking a medical man (for instance, in the south of Germany) what kind of oil he prescribed, he always answered, the brown. I afterwards discovered, however, in several instances, that he did not mean the brown oil described in books and used in the arts, but the deeper tinged of the two yellow coloured transparent

kinds, met with in the shops. Other practitioners have informed me that they used the white or light kind, but I found that they still used the yellow variety, which they called white or light to distinguish it from the brown.

Many apothecaries in the large towns of Germany have told me that they only keep two kinds, which they call the white and the brown, and that the latter only is used medicinally; but this, in point of fact, is the yellow variety. At Wildbad, however, being present at the half-yearly meeting of the medical association of Wurtemberg, I had an opportunity of examining and comparing the three different kinds of Cod liver oil, then presented to the meeting.[1] The first was of a light straw colour, almost white, much resembling, in appearance, castor oil, perfectly transparent, and of the peculiar taste to be afterwards described. The second was of a golden colour, also transparent, but somewhat less disagreeable to the smell and taste; and the third was of a deep chesnut brown colour, almost opaque, exceedingly nauseous to the taste, and produced an impression on the tongue which gave rise to a burning sensation. Of these the second or deep golden yellow colour is for the most part used medicinally throughout Germany, although, in different places, it is more or less turbid and deep in colour. By some,

[1] September, 1840.



however, the third or brown kind, notwithstanding its disgusting taste, is preferred. When in Mayence last March, I was furnished by Mr G. Von Siebold, an apothecary of that town, with a Cod liver oil, which he said had been prepared for medical purposes with great care. It was clear and transparent, and of a dark reddish colour when held to the light, resembling the colour of diluted tincture of iodine. The taste of this oil is not more disagreeable than the yellow variety, but not having hitherto been much used in medicine, its therapeutic virtues are unknown. These are the only four distinct kinds which I have been enabled to examine personally, and with the view of distinguishing them clearly from one another, shall speak of them as the white yellow, red or brown varieties. *Ol. album—ol. flavum—ol. rubrum—and ol. fuscum.*[1]

[1] I have some reason for believing that these different varieties are unknown in France and England. After searching through almost all the wholesale warehouses in Paris, and examining different specimens of fish oil, it was only at the house of Messrs Lebreton and Co., in the Marais, that I could find a genuine Cod liver oil. In colour this was between the yellow and red varieties, and perfectly transparent. They were only acquainted with this one kind which was obtained at the French fishery at St Malo. The oil distributed to the Parisian hospitals, from the Bureau central de Pharmacie, on the other hand, was dirty, opaque, dark brown, and of a peculiarly disgusting taste and odour.

In London, I found the best Cod liver oil at the house of Messrs Jones and Co., Leadenhall Buildings, Gracechurch Street, which was very similar in colour, taste, and smell, to the red oil I obtained in Mayence. Here, also, there was only one kind, which was ob-

The processes by which the oil is procured from the fish are differently described by writers, and the accounts of the different apothecaries and practitioners with whom I have conversed on this point also vary considerably. Duhl says, that the liver is placed in separate casks and allowed to putrefy, by which means the oil is separated. Geiger states, that the light variety percolates by itself from the liver of the fish, but that the brown kind is obtained by boiling the residuum, when no more of the former will flow out. This is the process apparently followed at Bergen, in Norway. Dr Faye of Christiana, however, who has himself visited Bergen, informs me that three kinds are prepared there,—

tained from Newfoundland. I learnt, however, from Mr Jones, that different hogsheads in a ship-load of the oil contained different kinds, as in some it was very light, and in others dark. He mixed them altogether, conceiving that as the oil was only employed for manufacturing purposes, it was a matter of no consequence. This explains the difficulty I have met with in obtaining more than one variety out of Germany, and shews that, at the fishery where the oil is prepared, care has originally been taken to separate the kinds which possess different degrees of purity.

In Edinburgh I have obtained very good Cod liver oil, at the house of Duncan and Flockhart, and at that of Mr Macfarlane, druggist, which appears to have been made in Newhaven. This also was an *oleum rubrum*, and no other variety is known. I have ascertained, however, that it was very rich in iodine, and have given it in several cases with a good result.

Until the medicinal effects of these different kinds of oil are ascertained, I should advise druggists to obtain, from Hamburgh or Bremen, that kind which has been employed with such good effect throughout Germany, and which, in colour, resembles old Malaga wine.



one by spontaneous percolation, a second by pressure, and a third by coction. According to Marder, the light oil flows from the liver during the first few days, merely by the action of the sun's heat, and the brown oil is procured afterwards from a period of eight to fourteen days, when it has become putrid. The merchant Balzer, of Cologne, on the other hand, states that both sorts are obtained by the artificial application of heat, that the lighter is the first portion which is procured and skimmed off, and that the brown is procured by a stronger heat, which induces a certain degree of decomposition. According to him also, the age of the fish, as well as the method and time of keeping the liver, exerts an influence on the product. The merchant Jobst, of Stuttgard, asserts that the lighter oil is obtained by boiling the liver, and the brown by boiling also the intestines which are surrounded with fat.[1]

Dr G. H. Richter, of Wiesbaden, has given a very clear account of the different kinds of oil, and the mode of their preparation, which he received from a Swedish physician.[2] According to him there are four kinds, obtained from the liver of the different species of the genus Gadus, but more especially from the Gadus Morrhua, Gadus Callarius, and Gadus Carbonarius. (*a*) The first, which is almost of a

[1] Hufeland's Journal. 1830 and 1837.

[2] Med. Zeitung herausgeg. vom Verein für Heilk. in Preussen. 1838, No. 33.

gold yellow colour, much resembling old Rhine wine, quite clear and clean, and with a peculiar strong fishy smell, is obtained by the heat of the sun acting on the liver, placed in large cylindrical glasses. The oil then comes away, leaving the other fatty matters as a residuum. This kind is the most active, but as it cannot be obtained, in comparison with the other kinds, in so great a quantity, is seldom found in commerce, and is very dear. (*b*) When from the liver, treated as above described, no more oil can be obtained, the residuum is placed in vessels made expressly for that purpose, (or, in some laboratories, on tinned copper plates), and is exposed to 40° Reaumur, whereby a considerable quantity of oil flows out, which is darker and not so clear as the former, but has still a strong fishy smell, and in colour is between that of Madeira and Malaga wines. This kind is little inferior to the other, and in Sweden, is equally used internally as a remedy. (*c*) When no more oil can be obtained from the liver in this manner, the residuum is placed in a kettle, cut in pieces, and then roasted, whereby the third kind, or the less pure train oil, is procured. It is thicker than the former kinds, not clear, it resembles in colour common syrup, but is somewhat browner, and possesses a strong, penetrating and burning fish taste and smell. This sort, which not only contains the oily and fatty, but also the biliary ingredient of



the fish's liver, is never used as a remedy in Sweden, but is employed in the preparation of leather, and hence is sold in immense quantities under the name of Curry oil. (*d*) Besides these, there is prepared by chemical means a fourth kind, which is quite clear, has a very weak fishy smell, is similar in appearance to olive oil, and is disposed of in commerce as the only pure oil, but is never used internally in Sweden, and is there considered inert.

Another method by which the oil is prepared, has been described by Mr Tiedemann, a wholesale merchant in Bremen, and published by Gmelin.[1] According to him, livers of the Dorse (*Gadus Callarius*) are exposed to the sun in a cask standing upright, with three spigots, one above another. The fat is thus melted, and on the removal of the upper spigot the clearest oil flows out, which is the best for medical purposes. Later the middle, and then the under spigot is removed, which furnishes two kinds of brown oil. The residuum left in the cask, subjected to hot pressure, yields a very dark and thicker oil, which is for the most part used in the preparation of leather.

M. Gouzée[2] states, that the oil is prepared at Antwerp, by exposing the livers of the *Raya pastinaca* Linn. (*pylstart* of the Flemings) to the sun in vessels.

[1] Annalen der Pharmacie. B. 32, p. 325.
[2] Annal de Med., Belg. 1838.

The oil, which soon floats, is decanted, and this is made to undergo several times the same process, in order to obtain at length an oil pure and limpid. The residue is collected in order to serve as a liniment.

According to Dr Donovan,[1] it is prepared on the coast of Ireland, by heating the livers of the Cod in an iron pot until their substance is broken down; the oily pulp is then thrown into a canvass bag, and drained with pressure. The *mare* which remains in the bag, holds much of the oil absorbed. A second heating and pressing separates much of it, but the produce is dark coloured and strong scented.

Dr Edmonston of Shetland informs me that the oil is prepared in that island, by first steeping the liver in cold water for a little time, to wash away the blood and other impurities. It is then cut into small pieces and put into an earthen vessel with cold water and placed on the fire. As the oil separates and rises to the surface it is skimmed off. In this state it is at once fit for use either internally or externally. If it has to be kept, the oil must be shaken in a glass with cold water, several times changed, and thus purified. It is then bottled, and excluded from light, heat, and air.

At Newhaven near Edinburgh, the fishermen simply boil the livers in an iron pot, and then filter it through a towel containing a little sand.

[1] Dublin Journal. No. 51, p. 300.



From the different accounts now given of the means by which the oil is procured, it appears evident, that it is obtained in various countries by various modes of operating; and it is yet to be determined to which, more especially, the preference is to be given for medical purposes. There is every reason, however, to suppose, that should the oil ever come into the same general use in Great Britain as it has done in Germany, its value, as a means of cure, might be augmented, by determining with precision the species of fish which yields the best kind, and by giving proper directions for its careful preparation.

In the memoir of Dr Donovan, before alluded to, the author points out the deleterious influence of putrefied animal matter on the human economy, and the caution which should be employed in introducing into the stomach any substance tainted with so violent a poison. He refers to facts which indicate that a high degree of heat applied to animal fats changes their original properties, and induces in them an acrimonious principle, capable of producing strong effects on the animal economy; and concludes, that in preparing Cod liver oil for medical purposes, putrefaction and charring should not be induced.

He recommends the following process, as the one which, from his researches, is most likely to procure an oil that will not produce any disagreeable taste, or injure its capability of resting lightly on the stomach:—"Take any quantity of livers of Cod, throw them into a very clean iron pot, and place it on a slow fire, stir them continually until they break down into a kind of pulp: water and oil will have separated. When a thermometer, plunged into the pulp, will have risen to 192° the pot should be taken from the fire, its contents transferred into a canvass bag, and a vessel placed underneath: oil and some water will run through. After twenty-four hours, separate the former by decantation, and filter it through paper." Dr D. further remarks, that the product of pure oil is variable. He has obtained so much as a gallon from twenty-eight pounds of livers, the produce of fifty cods; but some times the livers will afford much less. This estimate is true only when the fish is in the best season, and fully grown. Towards the close of the season the produce will be less. The livers of some cods are flaccid, and lie flat without plumpness on a plane surface. These afford a deficient quantity of oil, a brown, strong smelling quality, and a large portion of brown water: they are totally unfit for use, and their oil is disgusting. The livers are often found diseased and dark coloured; such afford a very bad



oil, and are of course to be rejected. The memoir concludes by stating, that in preparing Cod liver oil for medical purposes, three things are chiefly to be attended to:—the livers must be perfectly healthy; they must be as fresh as possible, the least putrescency being injurious; and the heat at which the extrusion of the oil is effected must not exceed 192° Fahrenheit.

The opinion which Dr Donovan expresses regarding the evil effects of putrescency in the oil, appears to be partly theoretical, inasmuch as abundant evidence will be offered in this treatise, that the employment of the oil, as ordinarily prepared in Germany, even the most common kind, has not been followed by the effects he anticipates. Undoubtedly it is of great advantage to possess an oil of a bland nature, and without any disagreeable taste, but it is yet to be seen whether the oil as prepared by Dr Donovan, or that described by Dr Edmonston, possesses the medical properties of the kinds used medicinally in Germany. It is also to be regretted that Dr Donovan did not attempt to determine whether the oil he recommends to be employed, contains iodine as a constituent.

## SECTION II.

### PHYSICAL AND CHEMICAL PROPERTIES OF THE COD LIVER OIL.

Between the light and dark kinds of the oil, there are very wide distinctions, as well to the senses, as to chemical researches. The former are clear and transparent, more or less of a gold yellow, or yellow colour, weak fishy smell and taste, have the consistence of common poppy oil, and are of the specific gravity of ·920. The latter, or darker kinds, are opaque, and sometimes contain a sediment, which in some specimens is more and more abundant as the oil is drawn from the bottom of the cask. They are more or less of a brown chestnut colour, strong, disagreeable, half putrid, and empyreumatic smell; burning, bitter, and somewhat acrid taste, retained some time upon the tongue; of the consistence of common domestic syrup, and specific gravity of ·921, (according to the Sleswig and Holstein pharmacopæia, ·923.) Both kinds dry gradually on exposure to the air.

The oil obtained by Dr Donovan has a specific gravity of ·934, is of a pale yellow colour, and the taste resembles that of a cod boiled for the table,



when in excellent condition. It is bland, by no means disagreeable, and totally free from rancidity. It is very liquid. In cold weather, it deposits much stearine, and this ought not to be separated.[1] The oil prepared in Shetland, has a mild, but slightly fishy taste, a faint but peculiarly marine smell, a greenish colour, and a consistence nearly that of castor oil.[2]

According to Marder,[3] when the light kinds are exposed to a cold of 13° Reaumur, a solid fatty matter is separated, consisting of 3·333 Eliac acid, ·625 margaric acid, and ·832 glycerine. The brown oil remains unchanged even when exposed to a temperature of 10° R. At a heat of 100° R., the light oil is decomposed, and a thick white cloud separated, whereas no change takes place in the brown kind even at a temperature of 120°. Both kinds are soluble in ether, and an excess of alcohol, only the brown oil requires a greater quantity of alcohol, and a higher temperature. Distilled water shaken with both sorts, becomes cloudy, and acquires the peculiar smell and taste of the oil. If agitated with it for some days, separated, and evaporated to the consistence of extract, the residuum appears yellow, and almost transparent, is of a high consistence, smells

[1] Op. cit. p. 363–4.
[2] Dr Edmonston's private communication.
[3] Hufeland's Journal. Bd. 70. s. 85.

almost like herring, is disagreeably bitter, greasy in the air, and readily dissolved in water or spirits of wine. The watery, as well as the ethereal and alcoholic solutions undergo no change on the addition of ammonia, diluted sulphuric acid, nitrate of barytes, and corrosive sublimate. Acetate of lead (according to Wurzer)[1] produces a white precipitate, and sulphate of silver, a very light brownish cloud. Ferrocyanate of potass occasions no change. Tincture of galls causes a cloudiness, which is precipitated on the sides of the glass in the form of a light brownish greasy mass, which is soluble in spirits of wine, but not in alcohol. The subacetate, as well as the super-acetate of lead in excess, produce with both kinds of oil a linimentatious fluid. Caustic ammonia forms with the light oil a soap, with the brown, a homogeneous mass, little soluble in water. Muriatic acid separates itself from both kinds of oil unchanged. The hydrate of barytes combines with both kinds, with the light, forming a milky, with the dark oil, a brownish fluid, which in no way gives trace of hydrocyanic acid. Nitric acid of the specific gravity of 1·192, mixed with an equal quantity of the light oil, causes no increase of temperature, but produces an ethereal kind of smell. After some days the whole separates into two layers, the upper, (the oil) brownish, the under, reddish. The brown

[1] Buchner's Repertorium der Pharm. Bd. 21. s. 119.



oil treated in a similar manner, becomes darker, assumes a leathery smell, and the coloured nitric acid acquires an odour similar to the oil. Sulphuric acid of the specific gravity of 1·850, mixed with two portions of the oil, produces heat, and the mixture at first becomes blood-red, and after some days black. It is also thickened, and smells like sulphurous acid. Water impregnated with chlorine, and shaken with the oil, causes no change in it, and on separation contains only muriatic acid.

According to the analysis of Spearman,[1] 100 parts contain :—

| | |
|---|---|
| Elain | 76·5 |
| Stearin | 19 |
| Orange, yellow, and colouring matter | 4·5 |

Marder has given the following analysis of the two kinds of oil.[2] There were in 200 grs. of

| The Clear Oil. | | The Brown Oil. | |
|---|---|---|---|
| Green soft resin | ·104 | Brown soft resin | ·130 |
| Brown hard resin | ·026 | Black hard resin | ·156 |
| Gelatin | ·312 | Gelatin | ·936 |
| Eliac acid | 111·833 | Eliac acid | 95· |
| Margaric Acid | 20·625 | Margaric acid | 8· |
| Glycerin | 16·632 | Glycerin | 18· |
| Colouring matter | 11·050 | Colouring matter | 25· |
| Muriate of lime | ·1046 | Muriate of lime | ·2092 |
| Sulphate of potass | ·1179 | Sulphate of potass | ·1883 |
| Muriate of soda | ·0361 | Muriate of soda | ·0614 |
| | 161·4906 | | 147·0909 |

Dr Kopp supposed from its therapeutic action on

[1] Dissert. de ol. jecor. aselli. Rostock, 1826.
[2] Hufeland's Journal. Bd. 84. Heft. 5. s. 115.

the human economy, that the ol. jecor. aselli contained iodine, and this substance, from researches made at his suggestion, was actually discovered in it by Hopfer de l'Orme.[1] The process of De l'Orme, with another by Hansmann, is given in the 22d volume of the Annalen der Pharmacie.[2] This is the first time that iodine has been discovered in any of the vertebrata, and thus certain fishes, as well as sponges, mollusca, and marine plants, have the power of accumulating this substance.

Marder doubted the existence of iodine in the oil, because he could not extract it with alcohol. Potemka, Martins, and Sarphati,[3] have also endeavoured in vain to find it. On the other hand, from the repeated researches of Hopper de l'Orme, as well as from those of Hansmann, Bley, Brandes, and Springmühl,[4] there could remain little doubt of its presence. Lastly, Gmelin, who, in the 29th vol. of Annalen der Pharmacie, had stated that he could not detect any iodine in the oil, published a second memoir in the 31st vol. of the same journal, in which he attributed his former want of success to his having operated on an oil that was not genuine. Having, however, been furnished with a pure oil by Mr Tiedemann, an apothecary in Bremen, he was

[1] Hufeland's Journal. Bd. 82. Heft. 4. 115. [2] S. 170.
[3] Med. Zeit. vom Vercin f. Heilk. in Preussen. 1838. No. 33 und Bd. s. 15. [4] Pharm. Central Blatt. 1837, 1814.



enabled to prove that it contained iodine in the clearest manner. He gives the following process, which, from his researches, appears to him the best mode of operating, and the one least liable to occasion a loss of iodine.[1] "Soapify in a water bath half an ounce of the oil, with as much or somewhat less of the hydrate of potass and water, as are necessary. After it is cool the watery fluid is to be filtered from the soft soap, which is to be nearly neutralized by sulphuric acid. Allow most part of the sulphurate of potass to chrystalize, evaporate the fluid which remains, then heat the residuum, when powdered boil it in alcohol, lastly, filter and evaporate to dryness. The salt thus obtained and dissolved in a little water is enough for three or more reagents to act on—such as with starch and oil of vitriol; with starch, muriatic acid, and chlorate of potass; and with sulphuret of carbon and oil of vitriol. Nitric acid alone, as well as weak sulphuric acid, produce with this salt no blue colouring of the starch, because it contains iodine in the form of iodate of potass."

I requested my friend, Mr Smith of South Carolina, a gentleman well conversant with chemistry, to repeat the process of Gmelin on a specimen of the oil I brought with me from Germany to Paris. He kindly consented, and we analysed it together, and

[1] Annalen der Pharmacie, B. 31, s. 323.

detected evident traces of iodine, which exhibited itself on the addition of chlorine by the formation of a dark rosy tint, somewhat approaching the violet, and was again dissolved in an excess of chlorine. Mr Smith stated the result of this analysis at a meeting of the Parisian Medical Society, April 22, 1841.

Several other specimens of the oil which I procured were subsequently analysed, and after repeating Gmelin's process many times, Mr Smith was led to adopt some slight improvements in the details of the operation, which, to the practical chemist, may not be without value.

The least troublesome mode of soapifying the oil, although it takes a longer time, is to introduce it into a phial containing an equal bulk of water, holding in solution more than one half its weight of caustic potash. The phial should now be well shaken, and left in a warm place for two or three days. At the expiration of this time the contents should be placed in a vessel capable of holding six or seven times its bulk, and an additional quantity of water added. Digestion is now to be carried on for an hour over a slow fire, at the end of which time it will be found that the oil is completely decomposed.

It was found that all the oils are not soapified with equal facility. In some cases the water subsequently separates perfectly, in others it remains mingled with the soap. In the latter case sulphuric acid should be added to the soap until it floats about in the water, in the form of white masses. These are to be separated, and the liquid, which will be slightly acid, is to be rendered somewhat alkaline. When this liquid is filtered it is to be treated as Gmelin directs, until after the alcoholic solution is evaporated to dryness, when, instead of treating it by water, it will be found best to add a few drops of sulphuric acid, diluted with twice its bulk of water, so as to saturate the alkali, and render the solution of the salt to be tested, acid. This should be introduced into a tube containing a few drops of starch, and a slight rosy tint will generally make its appearance if iodine be present. Sometimes, however, no indications of iodine will be given, until a very dilute solution of chlorine (one part of a saturated solution, mixed with twenty-five parts of water) be added. This addition also will, in every case, increase the intensity of the colour.



My friend, Dr Wilson, lecturer on chemistry, in Edinburgh, followed the above process in analysing the specimens of the oil I procured in this town; and by paying greater attention to the steps of the process than I suspect we did in Paris, was enabled to produce, on adding the starch, a deep violet colour. This gentleman writes to me, "as the addition of

sulphuric acid, in Gmelin's process, besides complicating the analysis, seems to risk the loss of iodine, I repeated the analysis of Mr Duncan's oil without employing acid. The oil, accordingly, was saponified with excess of caustic potass, the strongly alkaline liquid filtered from the soap, and evaporated to dryness. The residuum was now transposed to a porcelain crucible exposed to a full red heat, till the whole organic matter was burnt away. The contents of the process were then digested in alcohol, and the remainder of the process was the same as Gmelin's. Iodine was detected by this plan easily; but although the process is simpler in its details, and apparently obviates all risk of iodine escaping, in the single case in which it was tried, the evidence of iodine, though sufficient, was by no means so striking as in a similar portion of the same oil analysed in Gmelin's way."

Since writing the above, I have seen a memoir published on this subject by Wackenroder,[1] who has proposed a process much more simple than that of Gmelin's, and one which apparently is less liable to cause a loss of iodine. This chemist has also ascertained in some specimens its relative proportions, and with an analysis of his memoir, I shall close this section.

*Wackenroder's Process.*—Four drachms or an

[1] Pharmaceut. Central Blatt. 1841. s. 11.



ounce of oil is to be warmed in a porcelain dish, with as much pure potass or soda, until a soap is formed. This is to be heated until it has become dry and brittle, or appears somewhat black. It is now to be placed in a slightly heated platina crucible, for which, however, one of earth may be substituted. After the carbonification of the soap is accomplished, the residue should be moderately calcined for a time in the open crucible, because an unpyreuma readily remains in the carbon which frustrates the experiment. The carbon is now to be extracted with plenty of water, and the clear watery fluid evaporated to dryness, a small quantity of carbonate of ammonia having been previously added. The alkaline residue will now wholly consist, or, in the proportion of one and a half, of carbonate of the alkali, from which the iodate of potass or soda may be easily separated in the cold, by the addition of three or four times its quantity of alcohol of 84 per cent, but most readily, if the salt be shaken with the spirit in a stopped bottle, and the clear liquid poured off. The carbonate of soda facilitates the extraction, if it is not dissolved. On evaporating the spirit of wine, the iodate of potass or soda is left generally mixed with some metallic chlorate, or carbonate of potass, which can be proved to contain iodine in the usual manner.

It is very difficult to determine the relative quan-

tity of the iodine, so long as soapifying the oil and carbonising the soap are the only means by which it can be separated. Large quantities of the oil makes the attempt very difficult, and small quantities contain so little of the iodine, that an unimportant and inappreciable difference of weight exercises a great influence in determining the relative quantity. Wackenroder never operated on more than 30·0 grammes of the oil.

The process was that above given for the qualitative analysis. Every admixture of chlorate of potass or soda was carefully avoided, and hence only pure calcined alkali, prepared from *sal tartari*, was used in the soapification. The spirit of wine poured off from the carbonised soap was evaporated to dryness, mixed again with water, and now saturated with a muriate of the oxide of silver. The addition of a little muriatic acid removes the remaining small quantity of carbonate of the oxide of silver, and an excess of ammonia, the chlorate and bromate of silver, which in like manner may be contained in the chlorine and bromine of the fat. The yellowish or white precipitate of iodate of silver should now be collected on a previously prepared filter, perfectly washed and strongly dried. To prevent an error in the weighing, the filter was placed in another of equal weight. In this way out of 30·0 grammes of clear brown Cod liver oil, was procured 0·018



grammes of iodate of silver, and from an equal quantity of another oil 0·009 grammes, which in the first case gives 0·324 per cent. and for the second 0·162 per cent. of iodine in a hundred parts of the oil.

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## SECTION III.

### ACTION OF THE COD LIVER OIL ON THE HUMAN ECONOMY.

*Physiological Action.*—Carron du Villards who has observed the effects of the oil on his own person when in health, remarks, that after taking a dose he experienced "a very nauseous taste not easily to be removed, somewhat resembling that of putrid fish; further a biting sensation in the throat, in conjunction with the secretion of an adhesive saliva; which symptoms were more vehement in proportion to the impurity of the oil. The eructation of a nauseous gas continued some time after taking the dose. There followed colic pains, then light stools, together with an increased secretion of urine, both secretions possessing the characteristic smell of the oil."[1] It is seldom, however, that the effects are so

[1] Schmidt's Jahrb. Bd. 5. s. 147.

violent as above described, and they appear to vary in different persons according to the sensibility of the stomach and nerves of taste. In very rare cases it is again vomited, but the generality of individuals soon overcome the nausea, and after some days' use of it, find no difficulty in keeping it on the stomach. It is astonishing how custom reconciles individuals to taking this certainly highly disagreeable remedy, even those who at first have expressed for it the strongest disgust. The Laplanders, and the inhabitants of some other northern nations, it is well known, take it habitually, and consider it a delicacy. Even in Shetland, I am informed by Dr Edmonston, that it is used extensively, when fresh, as an article of diet, instead of butter, and that it is universally considered palatable and wholesome. Many practitioners have observed that children take it much more readily than adults, and become sooner accustomed to its use. Riecke remarks, that they drink it by no means unwillingly, and even put their parents in mind of the proper time to take it.[1] Indeed the accounts which have been given of its disgusting taste, and of the unpleasant eructations it occasions, have been much exaggerated, more especially if applied to the yellow kind. For my own part, I do not think it more disagreeable to take than castor oil, and by no means so unpleasant

[1] Med. Cor. Blatt des Wurtemb. ärzth. Vereins. Bd. 10. s. 124.



as bal. copaiba, and many other remedies in daily use.

Brefeld, who has written the most perfect memoir on this subject, says, that he has given the ol. jecor. aselli to more than a thousand individuals, and has never seen it produce any injurious effect on the digestive functions of the stomach, even when it has been taken for years.[1] He remarks that, although the reverse might *a priori* be believed, he has never observed any such result, and is convinced of its innocuousness. It is true that sometimes during the use of the oil a disagreeable feeling in the neighbourhood of the stomach, loss of appetite, oppression in the region of the heart, loaded tongue, headache, &c., may arise, but these symptoms he considers accidental, and not attributable to the oil. In general the appetite remains unaffected, and the tongue as clean as it was before. Brefeld further remarks,[2] that in acute fevers, where the appetite is already lost, and the digestive powers much impaired, the oil is not adapted, and in such cases should not be given. It always requires some activity of the digestive process to assimilate it to the system, and render it useful. Yet this statement is only to be received *cum grano salis*, for in scrofulous or rheumatic diseases, with atrophy, where the power of assimilation appears at a very low ebb, where nothing more can be borne,

[1] Op. cit. s. 19. [2] Op. cit. s. 20.

where every thing that is taken passes unchanged, or where even the obstruction in the glandular system appears to increase, the oleum jecoris aselli restores the disturbed nutritive powers, removes the obstruction, quiets the unnatural hunger, or awakes the dormant appetite, and gradually adjusts the reproductive organs in an almost wonderful manner."

There can be little doubt, however, that the oil is not quite so innocent as Brefeld supposes. Numerous facts shew that where plethora or a disposition to inflammation is present, the symptoms considered by him as accidental are really induced by the oil. It is now also well known that in many cases where the patient has taken it uninterruptedly for six or seven months, nausea, vomiting, loss of appetite, or other derangement of the digestive functions have arisen, and hence the necessity of occasionally suspending its use, and administering bitter or feruginous tonics, with a view of strengthening the chylopoetic viscera. A farther proof that this substance is by no means innocuous is furnished by the fact, that of late years it has been given as a prophylactic to a great extent in Germany, even by the parents, when a scrofulous taint was suspected to exist in their children, and, in consequence, many of these have taken the oil for a long time, when no indications for its employment were present. In



several children so treated it has been observed that the digestion has become gradually more and more deranged, and that even atrophy was thus occasioned.[1] Such a result may readily be conceived to arise from the unnecessary and long-continued application of a remedy which evidently possesses such a powerful effect on the assimilating functions.

Some practitioners have noticed an increased number of stools to follow its employment, but Brefeld states, that although diarrhœa may occur during the use of the oil in persons with paralysed activity of the digestive powers, the oil is not the cause of it. Professor Romberg, of Berlin, informed me, with respect to this point, that diarrhœa was no contra-indication to its exhibition. On the contrary, he had often found that when the bowels had been much relaxed the oil acted as an astringent. Other medical men, on the other hand, attribute to it laxative properties,[2] and consider that diarrhœa contra-indicates its use. I have seen several cases where this symptom was increased, and others where it was checked by the oil, an apparent contradiction, which is explained by the diarrhœa being dependent in different persons on different causes. When it is occasioned by an inflammatory or irritated state of

[1] Summarium des Neuesten und merkwurdigsten aus der gesammten Medicin, 1841. No. 1. s. 41.
[2] Schmidt of Stettin. Rust's. Mag. Bd. 35. s. 33.

the digestive canal, it does injury, but in those cases where want of tone exists in the intestinal walls, or where the chyme is rendered irritating from a change in its chemical properties, it tends to remove it. Hence it increases the diarrhœa in dysentery and acute febrile affections, and checks it in rachitis and atrophia mesenterica.

Brefeld does not consider that its use induces any critical appearances, although he gives a case of caries, where an irruption of the skin, similar to that of psora, was developed, and from that time the improvement caused by the oil made rapid progress. Bardsley, Fehr, and Rösch, however, have observed the use of the remedy to occasion critical eruptions on the surface of the body, and other practitioners have remarked an increased evaporation from the skin. In several cases it has been observed to possess highly emmenagogue properties, having increased the flow of the menses to such a degree as to render a suspension of its use necessary. It seldom produces any change in the quantity or quality of the urine, although this has sometimes been observed by Richter, Asmus, and others.

All these effects may, more or less, depend upon the dose, and idiosyncracy of the patient. Reister has analysed 71 cases, given by different authors; (viz., 40 by Schenk, 13 by Schütte, 8 by Reder, 8 by Bettenger, 1 by Wesener, and 1 by Volkmann), with



a view of determining its effect on the different functions of the economy. The following are the results.[1]

*Stomach.*—Nausea was observed in three cases; vomiting, also, in three cases; in one case loss of appetite, and sensation of ardor in the stomach; the voracious appetite often observed in rachitic children was diminished; in one case cure of fetid breath.

*Intestinal canal.*—A greater or less increase in the alvine evacuation in seventeen cases.

*Urinary Apparatus.*—Cure of incontinence of urine in two cases; acceleration of the urinary secretion, with a bricky sediment, in eight cases.

*Generative Apparatus.*—Increase of the menstrual evacuation, so strong as to render a suspension of the oil necessary. The same phenomenon was observed to repeat itself several times on the oil being again given; in one case re-establishment of the menses.

*Integumentary System.*—Increased diaphoresis in twelve cases; in one of these the perspiration was only observed on the inferior extremities; in two others it had the odour of the oil; in three cases it was preceded by a heat over the whole body; in another the body was cold; in one case there was a burning tingling of the skin; in two cases an eruption of small red spots with itching; in the last cases a cure was not obtained.

[1] Journal des Progres, &c. Tom. 2me. 2me. Serie.

In a great number of cases the pains were more or less increased by the first doses of the medicine.

*Therapeutic Action.*—Numerous observations at the bed side have established that the oleum jecoris aselli is a powerful stimulant to the reproductive processes of the economy, and hence may be classed among the tonic remedies. The name proposed for it by M. Taufflied, however, is perhaps the best, viz. that of *analeptic* (*αναλαμβανω, to repair*) as signifying a remedy which re-establishes in any way the perverted nutritive functions. It is also highly emmenagogue, as is shown by the analysis of cases by Reister, just given, and occasionally nauseating, laxative, diaphoretic, and diuretic.

This remedy has been found most useful in long-continued gout and rheumatism, and in the various cachectic diseases dependent on or connected with scrofula. Hence it has been employed in rachitis, malacosteon, caries, diseased joints, tubercular affections, enlarged mesenteric glands, obstinate chronic affections of the skin, &c. Most of these disorders, when connected with scrofula, may be regarded as different forms of one disease, the pathological cause of which appears to be some morbid change in the blood, and thus it is that the ol. jecor. aselli has produced the greatest benefit in a variety of affections which at first sight appear very opposite to each



other. Brefeld even has endeavoured to show that there is a strong analogy between the gouty, rheumatic, and scrofulous diatheses. He points out for instance that gouty parents very frequently produce scrofulous children, and individuals who in their youth were scrofulous, and especially rachitic, exhibit at a later period of life, great disposition to rheumatism. The form of the disease depends much apparently upon the age of the individual. Scrofulous affections are more common in the earlier years of life, and rheumatism and gout at an advanced age. It has often been observed in families of the lower orders, which have been badly fed and clothed, and living together in a confined space of air, that while the children are scrofulous, the parents suffer under obstinate rheumatism. A diet principally composed of indigestible, insipid food, with little azote and excess of carbonic acid, such as farinaceous food, cakes, liqueurs, fruit, &c. appear to predispose to both scrofula and rheumatism. Both are benefited by a dry warm air, and increased or caused by a moist, cold, and foul atmosphere. Hence in low and marshy situations they are endemic. Both are common in northern countries. In England and Holland they are widely spread. In southern countries they are less frequent and are comparatively rare in the tropics. In both diseases similar chemical changes take place in the animal economy. There is a great

disposition to the formation of acidity in the urine. There appears to be the same influence on the osseous system. Long continuation of the disease in advanced age is accompanied by osteo-malacia, while in early life rachitis is common. Lastly, there is a resemblance between the operation of remedies on both kinds of diseases, as baths, aconite, sulphur, guiacum, tonic remedies, quinine, &c. and the results obtained from the use of the ol. jecor. aselli (in chronic rheumatism, and scrofulous arthritis) strengthen the supposition of the analogy between the sediseases.

The therapeutic action of the Cod liver oil is slow. The diseases in which it is found beneficial are not susceptible of being cut short, like intermittent fever by quinine. In general its use must be continued long, at least a month, often six months, and sometimes for years. Quick results, though sometimes met with, may be considered rare. Thus in private practice giving it a proper trial is often brought about with difficulty. People are apt to think that a remedy which produces no quick sensible result must be inert, and hence many cures are interrupted, which to the physician hold out the greatest hopes of success.

The *Modus Operandi* of the oil may be said to consist in stimulating the lymphatic glands and vessels, and by these means increasing the activity of



the capillary system. By its action on the former the process of assimilation is facilitated, and the appetite increased. The quality of the blood is thus improved, and so lastly the different organs and structures of the body become better nourished, and receive more *turgor vitalis*.

Some are of opinion that in producing these effects, the oil acts as a specific, and consider that in scrofula and rheumatism it is as much to be praised as quinine in intermittent fever. The discovery of iodine being contained in it, however, has induced most practitioners to attribute the active properties of the oil to this substance. But long before this discovery had taken place, it was well established that its use was attended with great success in many of those cases in which many practitioners had given small doses of iodine with benefit. It was this fact, indeed, that first led Kopp to suppose it existed in the oil. In this respect therefore the ol. jecor. aselli somewhat resembles the old remedy of burnt sponge, the value of which was fully established in cases of bronchocele, before ever iodine was known to chemists. It has also been proved by practical observation that the ol. album is comparatively inert, and that the yellow and brown kinds possess the greatest medical virtues; and chemical research has since proved that the proportion of iodine is much greater in the two last than in the

first. These circumstances, therefore, strengthen the supposition that iodine is the active ingredient in the oil. On the other hand it has been stated by Falker,[1] that the iodine only forms $\frac{1}{1000}$ part, and that no influence can be ascribed to so small a dose as would necessarily be taken. In reply to this objection it may be urged that the exact relative proportion of the iodine to the mass of oil is unknown; that we are unacquainted with the state of combination in which it exists; and that, lastly, iodine thus occurring in a natural production, may be supposed to possess a stronger therapeutic action, than when obtained by chemical means, and then administered in the same way that we observe a particular salt to exert a stronger influence on the economy when taken in the form of a natural mineral water, than when given in substance.

Falker, in the paper above alluded to, has advanced the theory, that it is to the gum resin contained in the oil, that the therapeutic action must be attributed. He points out that no other ingredient of which it is composed can be considered to exert any influence over disease, and that this substance has long been established as a remedy in numerous cachectic disorders of the same nature, as those in which the ol. jecor. aselli has been found useful. Thus, for instance, it forms the principal ingredient in bal.

[1] Heidelberg Med. Annal. Bd. 6. Heft. 3, 1840.



peruvianus, bal. copaiba, turpentine, assafœtida, guiacum, myrrh, and a class of remedies which have been extensively used in similar cases.

The researches of Dr Ascherson of Berlin have rendered it probable that the action of the oil is to be explained in another manner. In a memoir presented to the Academy of Science, in Paris, November 12th, 1838, and subsequently published in Müller's Archives,[1] this gentleman pointed out the importance which should be attached to oil in organic formations, on account of its presence in the embryo of every organism. He shows by microscopical researches, that in the small transparent animals, and in seeds of plants, fat always exists in the form of an emulsion, that is in small drops from $\frac{1}{10}$ to $\frac{1}{100}$ of a millimetre in diameter, and even smaller, which are suspended in a watery fluid, and possess molecular movement. In the small microscopic crustacea, the fat, from the round form of its drops, and from its lively colour, presents a very elegant appearance. Thus, in the Daphniæ, Cyclops, &c., it is often scarlet red, and Swammerdam, who looked upon these drops of fat as the eggs, rightly ascribed to them the red colour of these animals. In the sacculated animals, on the contrary, the fat is colourless. In cer-

[1] Ueber die physiologische Bedeutung der Fettstoffe, und ueber eine neue auf deren mitwirkung begründete und durch mehrere neue Thatsachen unterstützte theorie der Zellenbildung. *Müller's Archives*, 1840.

tain examples of cyclops quadricornis, on the other hand, it is of three colours, viz., some drops are clear as water, others deep orange or almost red, and a third kind are of a dark Berlin blue. He points out that in the fungi, which, from their chemical constitution and mode of development, most resemble animals, the sporioles are drops of oil, and he is convinced that they form an essential part in the development of these vegetables.

Whilst the most celebrated physiologists seem agreed that the primitive tissue is formed of small granules or solid globules, an opinion defended by Valentin in his prize essay, Schwann, one of the most accurate observers in science, has stated that the different layers of the germinating membrane were formed of cells, and that the fibres of the cellular tissue, the muscles, the nerves, the vessels, and in a word every tissue of the animal structure, were nothing but metamorphosed cells. In this state of uncertainty, Dr Ascherson sought after new facts, and commenced a series of researches to determine the difference between the globules observed by Baer, Carus, and Valentin, and those described by Schwann.

Valentin mentions several kinds of globules, but without describing them distinctly, which, without figures, it is very difficult to do. The author sought to render the subject more clear by examining them



in the unimpregnated egg, and found three kinds of globules: 1st, those composed of coloured drops of oil: 2d, bodies much resembling the globules of pus, which were evidently the primitive cells of Henle, and those described by Schwann: 3d, the smallest, which perfectly resembled the drops of oil previously alluded to as having been seen in the embryo of plants. These globules appear before the others, and constitute the greatest portion of the yolk of the egg. That they were composed of oil was proved, 1st, by the action of alcohol which coagulated the albumen, but left the globules fluid; and, 2d, by the action of ether, which caused the globules to disappear, or nearly so. From these facts, then, the author concludes that these oil globules in man perform the same functions, as the similar globules in vegetables, and that oil is equally essential to the formation of cells in the vegetable and animal kingdoms.

The author now endeavoured to determine what part the oil took in the formation of the solid textures, and on reflecting that albumen is, next to oil, the most common substance in the organism of the embryo, he sought to investigate the reciprocal action of these two substances on each other. In so doing he was led to the discovery, that when albumen was brought in contact with a fluid fat, a coagulation immediately took place in the former, in

consequence of which a sacculated membrane or cell was formed, which contained a molecule of the latter. He concluded that during life the same process must take place, and that in the animal organism cells were formed from fat and albumen, which are to be regarded as elementary cells from which all other cells, although changed in form, proceed.

The method in which the elementary cells are distributed throughout the frame will be readily understood by attending to the process of digestion. Thus the chyle is nothing more than an emulsion, a mixture of oil and albumen, which even in the lymphatics of the small intestines pass into the formation of sacs or cells; and the deeper the chyle is forced into the lymphatic system, the richer it becomes in vesicles, until these have reached their highest development in the blood by the formation of blood globules. Again, the chyme in the stomach is highly albuminous and acid, but on arriving in the small intestines it loses these properties in a great degree, and assumes the form of an emulsion. This can only be occasioned by the addition of the bile and pancreatic juice. Physiologists have long pointed out that the bile is very rich in oil, and that it also possesses the power of liquefying the fat contained in the food. Hence it is highly probable that the function of the bile consists in preparing the chyme in order that it may produce a properly



constituted chyle; that the albumen of the chyme separates the fluid fat furnished and prepared by the bile, and by this conjunction of fat and albumen, the formative material for the organism is prepared.[1]

In order to understand the application of the above views to the pathology of scrofula, it is necessary to remember that the symptoms and course of this disease indicate that it is caused and kept up by some fault in the process of digestion.[2] The healthy performance of this function consists in the maintenance of the equilibrium between the digestive process in the stomach and that in the small intestines, or, in other words, so long as the stomach pours out only so much acidulous and albuminous fluid as is necessary to neutralize the bile and pancreatic juice, the digestion remains undisturbed. In scrofula this equilibrium is destroyed, there is a diminished activity in the small intestines, and the whole digestion is almost exclusively performed by the stomach. The predominance of the last, in the digestive process, at length becomes so great, that the contents of the whole intestinal canal are found to be acid, and the albuminous fluid runs into hard masses, which lose their property of becoming or-

[1] Although I consider the observations and theory of Dr Archerson worthy of consideration, numerous circumstances prevent my placing entire confidence in them.

[2] See sect. vi.

ganized. This, then, is the material which is received into the lymphatics, instead of the normal emulsion formerly alluded to, and, on joining, the blood necessarily tends to deteriorate that fluid. At length the blood itself contains albumen in excess, on account of its non-mixture with the other element, oil, which enables it to become adapted to the organism, and, after a time, it is effused into the cellular tissue of the external or internal membranes, or into the parenchyma of the organs, constituting the different kinds of tuberculous disease. Very often, also, a mechanical stagnation of the abnormal lymph takes place in the lymphatic vessels, causing obstruction and swelling in the lymphatic glands. From the faulty preparation of lymph so occasioned, the healthy formation of blood ceases, and lastly, by the repeated effusion of useless matter, or from the irritation and disorganization thus produced in important organs, exhaustion appears, and the vital powers sink.

We can now understand that, from the views previously explained regarding the operation of fluid fat on albumen, and that of the bile on the chyme, the mode of action of oil in scrofula may be deduced. The particles of this fluid, by combining with the albumen, would first correct the excess of the latter substance, and induce a better formation of lymph. The general strength of the system



would thus be increased, and the functions of the small intestines gradually restored to their former activity. By a continued administration of the oil, also, this fluid may at length be more than proportionate to correct the albumen found in the stomach, and its molecules will then combine with those of the morbid products which have become deposited. Thus, not only is the original derangement in the digestive organs corrected, but the useless and injurious results it may have occasioned also removed. This theory has been supported by Dr Baur, who has given several instances where the scrofulous disposition has been removed by rubbing in externally different kinds of oil.[1]

Our knowledge of the influence which fatty matter may exercise upon the animal frame, and of its utility as a therapeutic agent, is very limited. In our old pharmacopeias, the fat of different animals, as of the dog, reptiles, &c., played a very conspicuous part, and from the results of modern researches it would appear that our forefathers were not wrong in attributing important therapeutic properties to these substances. Dr Popken has lately asserted[2] that he has produced almost the same effects as have resulted from the administration of the ol. jecor. aselli, by giving, continuously, roasted bacon, in ʒij

[1] Archiv. für. die gesamente Medicin, von Hauer. Bd. I. s. 256.
[2] Casper's Wochenschrift. 1840. No. 38.

doses; and Dr Archerson, of Berlin, informed me that he had cured several scrofulous complaints among the higher classes by causing the individual to eat, daily, a quarter of a pound of caviar, a Russian delicacy, consisting of the prepared roe of some fish, and much abounding in fat. Another observation, also, is connected with this subject, viz., that butchers, oil men, tallow chandlers, tanners, and other individuals who are continually coming in contact with fatty matter, are particularly robust, and well-nourished, and are known to be remarkably free from scrofula.

Although this explanation of the action of the oil has certainly, therefore, many facts in its support, I cannot divest myself of the opinion that the ol. jecor. aselli owes its superiority over other substances of a like nature to the iodine it contains. It is a principle established in therapeutics, that by the combination of two drugs having similar medical properties, the relative action of the mixture is much increased, and much more certain, than if the same quantity of one alone was given. It is possible, therefore, that it is to this combination of iodine on the one hand, and that of the antiscrofulous properties belonging to fatty matter in general on the other, that the therapeutic action of the Cod liver oil may be ascribed.



It must be remembered, however, that the different theories now mentioned were all formed after the utility of the oil in disease had been fully established, and that consequently whatever speculations may be indulged with regard to its *modus operandi*, their reception or rejection can in no way influence the value of the oil in a practical point of view.

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## SECTION IV.

### DOSE, AND METHODS OF EMPLOYING THE COD LIVER OIL IN THE CURE OF DISEASES.

Originally the ol. jecor. aselli was taken indiscriminately by the lower orders in large doses. Brefeld states that he has seen the peasants swallow from half a pint to a pint at a time, mixed with a little red wine or brandy, a dose which, if the disease did not yield, was repeated in from four to eight days. Medical men have given it in smaller doses more frequently repeated. One or two table spoonfuls is the quantity usually administered to an adult from two to four times a-day. A child of twelve months and under may take a tea-spoonful two or three times daily.

In general Brefeld gives the oil only twice a-day, but when the digestive powers are strong, he gives it three times. He usually begins with half a table-spoonful, so that the patient may gradually accustom himself to the taste. He was induced to do this from having been told by several individuals that it was only at first that the remedy was disagreeable, and that a persistance in its use removed all the dislike and nausea they previously experienced. Rust gave one large dose, ℥iv. daily, which some people may prefer, as they thus only experience the disagreeable taste once in the day. It is thus, however, not so readily retained on the stomach. Rust gives the following directions for taking it: "When the patient swallows the oil, he should shut the eyes, and compress both nostrils with the fingers. He should immediately wash out the mouth with cold water, and drink a half or a whole cup of black coffee. Directly after the dose has been taken, the bottle which has contained it should be removed from the room. In this way a patient may take the remedy for weeks together, without his knowing, tasting, or smelling what he swallows."[1]

In order to remove the disagreeable taste it leaves in the mouth, various correctives have been recommended, such as peppermint water and lozenges,

[1] Rust's Aufsatze und Abhandlungen aus dem Gebiete der Medicin, Chirurgie, &c.



different confections, &c. Rust ordered black coffee, and Carron du Villards recommended lemon juice. According to Brefeld, the best means of this kind is powdered sugar, which combines readily with the particles of the oil hanging about the mouth, most quickly removes the train-oil taste, and is easily swallowed. Dry biscuit answers the same purpose. He also allowed the individual to drink a half or a whole glass of red wine afterwards, which in most cases removed the feeling of nausea. Schütte with the same view gave bitter brandy, or a liquor containing aniseed. Riecke remarks on this subject, that when he first gave the oil, he mixed it with syrup of orange, aqua anisi, gum arabic, &c. but he found that these additions in no way removed the taste, but on the contrary rendered it worse, by increasing the quantity to be taken. He therefore now always gives the pure oil, and orders the individual to take after it, either some sugar, warm milk, or weak coffee. I have found a little powdered sugar and cinnamon to be the most efficient corrective.

Brefeld says he has given the oil in more than a thousand cases, and has met with very few individuals who positively refused to take it. "When it is necessary," he remarks, "the patient will little trouble himself about the taste of what will do him good, but it is certainly not calculated for luxuriou

or imaginative females." I have been told that the taste of this substance will preclude its employment in England. One medical gentleman of eminence in the profession informed me, that he would rather die than take the first dose. Such may be the opinion of persons enjoying health, but it is probable that my countrymen, as well as individuals on the continent, will swallow any substance which holds out the hopes of cure, after having suffered a few years from protracted rheumatism or gout, or from the wasting, painful, and dangerous diseases occasioned by scrofula. Indeed, I can confidently state, that this objection is purely imaginary. I have now given it to numerous individuals, and to some persons in the higher ranks, who on being assured that the nauseous taste would disappear, as the stomach became habituated to the oil, have taken it for two months without difficulty. One gentleman informed me, that although it was exceedingly nauseous the first few days, he subsequently took it with as much facility as he should have done a like quantity of milk. Children soon become accustomed to it, and take it readily.

The oil should not be taken in the morning fasting, as it is then much more liable to occasion nausea, and a disagreeable feeling of heaviness. It is best taken about an hour after a light breakfast, and again in the evening when dinner has been digested. If a third dose is given, it should be taken one or two hours before dinner. It has been shown that the employment of the oil augments a state of inflammation when present, and causes cerebral congestion, headach, heat of skin, &c. It is, therefore, always necessary before its administration, to remove this state, should it exist, by means of antiphlogistics.



The quantity of oil necessary to be taken in order to obtain a cure, does not appear to follow any certain rule. Schenk cured a rheumatism of two years' standing with six ounces, while, in similar cases, the same result has only been obtained after twenty or more pounds have been consumed. Bettinger states that he has given from twenty to thirty pounds, in four doses, daily, without its having produced any bad effect on the digestive functions. I have myself seen cases which have taken two ounces daily for a period of three years, with short occasional intermissions, with the best results. Case 8th is one of these.

To obtain any benefit, a genuine brown or yellow Cod liver oil must be employed. This is a matter of great importance, as the observations made in the hospital of Berlin,[1] and elsewhere, sufficiently prove. Professor Gmelin of Heidelberg even published a memoir on the chemical analysis of this substance,

[1] Rust's Mag. B. 18. s. 360.

and afterwards acknowledged that the oil he had operated on was not genuine.[1] Some hospital physicians of Paris informed me that they had given this remedy very extensively, without any good effect whatever. On examination I found, in several instances, that the oil employed contained no iodine, and in other respects was very dissimilar to the specimens I brought with me from Germany. On asking several merchants in Paris for a Cod liver oil, I was presented with common whale or seal oil, which are also denominated Huile de Poisson. In Germany, where immense quantities of the oleum jecor. aselli are sold for medical purposes, the peculiar taste and smell have been well imitated by steeping in the more common fish oils a little putrid herring, or mixing with them an oil extracted from the latter fish. Thus there is great difficulty, at present, in determining the genuine drug, which is only to be done by detecting iodine in it by chemical analysis. The process for this purpose is tedious, but that employed by Wackenroder is the least so.[2] Even this is no certain test, as chemical research has shewn that some specimens are much richer in iodine than others, while the addition of a small quantity of hydriodate of potass, or tinc-

[1] Annalen der Pharmacie, B. 29.

[2] See p. 33. Apothecaries and druggists should procure the oil from the wholesale merchants of Hamburgh or Bremen, from whence most of the oil comes at present employed in Germany.



ture of iodine, would be detected with great difficulty.

Several physicians have made attempts to correct the train oil taste and smell, and proposed various mixtures for this purpose, chiefly in the form of emulsion. The following are the best of these:

R.—Ol. Jecoris Aselli . . ℥j.
Liq. Kali Carbon . . ℥ij.
Ol. Ether. Cal. Arom. . gut. iij.
Syr. Cort. Aurant. . . ℥j. ℞ Ft. Emulsio, cujus capt. cochleare minimum unum vel dua mane et vespere. For children with Rachitis. *Fehr.*

R.—Ol. Jecoris Aselli
Syr. Cort. Aurant.
Aq. Anisi . . a. a. ℥j.
Ol. Calam. Arom . . gut. iij.
Gummi Arab. . . . ℥j. ℞ Ft. Emulsio, cujus capt. coch. magnum mane et vespere. In gouty swellings, Rachitis, &c. *Rösch.*

R.—Ol. Jecoris Aselli
Vin. Hungar. (vel Malag.) a. a ℥iv.
Gum. Arab. . . . ℥j. ℞ Ft. Emulsio, Adde
Syr. Cort. Aurant . . ℥j.
Elaeosacch. Menth. Pip. . ℥ij. ℞ Ft. Emulsio, Capt. coch. mag. dua, bis vel ter in die. *Brefeld.*

R.—Olei Jecoris Aselli . . ℥viij.
Gum. Arab. Pulv. . . ℥iv.
Aqua. comm. . . ℥xij.
Syrupi comm. . . ℥iv. ℞ Ft. Emulsio, cui, leni calore, adde
Sacch. albiss. . . ℥xxvj.

colat. refriger. adde

Aq. Flor. Naphæ . . ℥ij. ♏ Ft. *Syrupus Olei Jecinoris Aselli.* This syrup may be kept for some time, and is not unpleasant to take. *Duclou.*

R.—Ol. Jecoris Aselli . . ℥ij.—℥iij.
Aq. Fœniculi . . ℥j.
Gum. Arab. q. s. Ft. Emulsio. Adde
Syr. Cort. Aurantii . . ℥ss. ♏ coch. unum. pro dose sumendum. Given to children with Rachitis. *Tourtual.*

R.—Ol. Jecoris Aselli . . ℥ij.
Vitell. ovi unius
Syrup. Menth
——— Fl. Aurantii . a. a. ℥ij. ♏ Ft. Emulsio, cujus capiat cochleare magnum unum ter die. *Tourtual.*

I have never seen any good effect attend the exhibition of these mixtures, while the object for which they were ordered, viz., getting rid of the unpleasant taste, is rarely attained. Mr Macfarlan, apothecary of this town, however, was good enough, at my request, to combine some drops of the different essential oils with the oleum jecoris aselli, and I found that the essence of lemon, and oils of peppermint, cinnamon, and aniseed, completely neutralized the unpleasant train oil taste and smell. Should these, therefore, be again strongly objected to by a patient, I should order three or four drops of one of these oils, to be mixed with an ounce of the Cod liver oil. This aromatic addition might also remove the feeling of nausea experienced by some individuals.

Katzenberger, with a view of getting rid of the taste, proposed to give the oil in the form of clyster, and administered it this way in double and treble the doses taken by the mouth.[1] Most persons however, especially in England, would prefer an unpleasant taste to the daily use of clysters. Guerard and Brefeld have also used it externally with the best effects. In chronic keratitis it should be dropped into the eye. In atrophia mesenterica the integuments of the distended abdomen may be rubbed with it, and in diseases of the skin, ulcerations, &c., lint saturated with the oil may be laid over the affected part two or three times a-day. This mode of application, however, is not to be depended upon alone, and should only be conjoined with its internal use. It may be mixed with the oleum lavendulæ, or some other fragrant substance, to correct the train oil smell. The following form of liniment is recommended by Brefeld.



R.—Ol. Jecoris Aselli . . ℥j.
Acet. Saturni . . . ℥j.
Vitell. ovor. (sive Adipis Suill. insuls.) ℥iij. ♏ Ft. Linimentum. To be used externally in ulcers, fistula, &c.

It has been recommended that those individuals who prefer taking a number of pills, rather than a nauseous fluid, might have it prescribed for them in this form, by converting the oil into soap with soda. We have previously stated, however,

[1] Hufeland's Journal, B. 39.

that the oily matter itself may probably exercise great influence in its therapeutic action, and consequently it is not advisable to decompose it. The same objection applies to emulsions.

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## SECTION V.

### ON THE EMPLOYMENT OF COD LIVER OIL IN RHEUMATISM AND GOUT.

Dr Kay, physician to the Manchester infirmary, was the first medical man who gave Cod liver oil for the cure of rheumatism; and we have the following account from Mr Darbey, house surgeon and apothecary to that institution, of the circumstances which led to its being prescribed.[1] "A woman who laboured under the most excruciating rheumatism, and was an outpatient of this infirmary, being advised to rub her joints with the oil, was induced to take it at the same time internally. A few weeks restored her to the use of her limbs, and she was cured. However, little attention was paid to this case, as it was supposed that the alteration of the weather, and

[1] Percival's Essays, 4th edit. vol. ii. p. 360.



the medicines she had before taken, had caused the cure. About a twelvemonth afterwards, her complaints returned with double violence, and the same remedy restored her to health again. Encouraged by this second recovery, Dr Kay, one of the physicians to the infirmary, prescribed it for other patients, in similar cases; and it answered his most sanguine expectations. Since then it has been used by the other physicians with the greatest success."

As regards its beneficial operation in rheumatism, Mr Darbey remarks:[1] "Men and women advanced in years, whose fibres may be supposed to have acquired a degree of rigidity, find surprising effects from it. Some, who have been cripples for many years, and not able to move from their seats, have, after a few weeks' use of it, been able to go, with the assistance of a stick; and, by a longer continuance, have enjoyed the pleasing satisfaction of being restored to the natural use of their limbs, which, for a long time before, had been a burden to them." He also refers to two cases in which the oil had an extraordinary effect even on young persons whose ages did not exceed ten years, and concludes by saying, that "except bark, opium, and mercury, I believe no one medicine in the *materia medica* is likely to be of greater service," "and I could wish for a more general use

[1] P. 361.

of it, in order to prove that the above account of its good effects is no exaggeration."

Dr Percival, speaking of this substance, remarks, "while I was one of the physicians to this charity, (Manchester infirmary), I had the fullest evidence of the successful exhibition of Cod liver oil, in various maladies, of the class above described, which had resisted other powerful modes of treatment. And I frequently compared its operation with that of gum guiacum, by prescribing each, at the same time, to different patients in similar circumstances. These trials almost always terminated in favour of the oil; and the patients, who took guiacum, by conferring with their fellow-sufferers, were sometimes so sensible of making a slower progress towards recovery, as to request a change of one remedy for the other."[1]

Dr Bardsley also, much later, 1807, when treating of chronic rheumatism, observes, "From long and repeated experience, I am enabled to speak of it as a medicine of efficacious, but limited powers. In some instances, where every other means has proved unsuccessful, it has operated in a manner so decidedly beneficial, as to excite astonishment. But, on the other hand, it has frequently failed in some of the mild, and more common rheumatic affections.

[1] Op. cit. p. 355.



The circumstances under which I have found it most advantageous, when used both externally and internally, are the following: 1st, In the chronic rheumatism of elderly persons, where the muscles and tendons have become rigid, and the joints nearly inflexible, in consequence of the disease having been brought on by excessive labour, hard fare, dampness, and cold. 2d, In women whose constitutions have been worn out by repeated rheumatic attacks after parturition, and more especially in the decline of life. I have seen a few patients recover entirely by the exhibition of the oil; who, on their admission into the house, were unable either to preserve the body in an erect posture, or support its weight on the lower extremities."[1]

I have been thus particular in quoting the early authorities on this subject, because all the German writers who treat of the Cod liver oil, merely refer indefinitely to its having been given in the Manchester hospital, and coincide in attributing the merit of having first prescribed it to Schenk. It would appear, however, that the Manchester physicians were not only well acquainted with its great value in cases of chronic rheumatism, but that their experience had led them to discriminate the particular

[1] Medical Reports, p. 19.

cases in which, even at the present day, it acts with the best results.

It is certain, however, on the other hand, that notwithstanding the praises bestowed upon this remedy, by the writers above mentioned, no further notice appears to have been taken of it by the profession in England. Hence, it is generally considered throughout Germany, that to Dr Schenk of Siegen, is to be ascribed the merit of having directed the attention of medical men to its therapeutic properties in gout and rheumatism. In two memoirs published on this subject,[1] he has detailed a number of very severe and obstinate cases, which, through its use, were either entirely cured or greatly relieved. He states, as the result of his observations, that "the Cod liver oil ought to be considered as a specific in rheumatic and gouty diseases. It heals all chronic painful affections of the human body, wherever they are seated, whether internal or external, if they have originated in rheumatism or gout, as surely and as certainly as bark cures intermittent fever, or mercury the venereal disease." Numerous other memoirs and cases have been published by Wesener,[2] Mönning,[3] Amelung,[4] Wüste,[5] Gunther,[6] Volkmann,[7]

[1] Hufeland's Journal, Bd. 55 and 62.
[2] Ibid. Bd. 58, mai. s. 74.
[3] Ibid. Bd. 59.
[4] Ibid. Bd. 67, s. 106.
[5] Ibid. Bd. 84, s. 115.
[6] Ibid. 1824, August, s. 111.
[7] Ibid. s. 120.



Osberghaus,[1] Schütte,[2] Reder,[3] Spiritus,[4] Rust,[5] Suttinger,[6] Moll,[7] Rösch,[8] Brefeld,[9] Kopp,[10] Carron du Villards,[11] Gouzée,[12] Taufflied,[13] Delcour, &c. &c.,[14] and at present its use in these diseases is universal throughout Germany.

In the great Hospital La Charité, however, in Berlin, it was given in the year 1823, for the cure of rheumatism, without any good result;[15] but there can be no doubt that at that time the genuine oil was unknown in that city, for at the present moment it is given there with the best effects.

The oleum jecoris aselli is not beneficial in every kind of gout and rheumatism. In podagra and acute rheumatism with accompanying fever, occurring in young, good, or robust constitutions, the oil is of no service. Indeed, the gastric symptoms it occasions, scarcely ever allow it to be tried in such cases. Even in the chronic forms it has been observed by Schenk, Amelung, and others, that the rheumatic

[1] Hufeland's Journal, 1825, September, s. 130.
[2] Horn's Archive. für med. Erfahr. 1824, Juli. Aug. Heft.
[3] Diss. Inaug. de. oleo jecor. aselli. Rosteck. 1826.
[4] Rust's Mag. Bd. 16. s. 566.
[5] Ibid. Bd. 20. s. 563.
[6] Ibid. Bd. 26. s. 333.
[7] Schmidt's Jahr. Bd. 8. s. 143.
[8] Med. corr. Blatt des Würt. arztl. Vereins, Bd. 2, s. 185.
[9] Der Stockfish Liberthran. Hamm. 1835.
[10] Denkwurdigk. in der arztl. Praxis. Bd. 3. s. 336.
[11] Bulletin de Therapeutique, 1834.
[12] Annal de Med. Belge, 1833.
[13] Gaz. Méd. de Paris, 1837, p. 503.
[14] Gazette des Hôpitaux, Mai. 1841
[15] Rust's Mag. Bd. 18. s. 390.

pains are at first often increased by the oil, which should be regarded as a favourable symptom. Brefeld asserts that it is only in rheumatism that the oil is of any use, and that it is perfectly inert in gout. He carries this opinion so far as to declare that in doubtful cases, the success of the oil will determine whether the medical man is treating gout or rheumatism. Other medical men, on the contrary, (Osberghaus), have found its beneficial effects better marked in gout than in rheumatism. This difference is readily explained by the difficulty of diagnosing certain forms of these diseases from each other, and the uncertainty which prevails regarding the limits belonging to each. An analysis of the cases given by Brefeld himself will show that he has denominated some rheumatism which might easily be maintained to be gout. As it is not my object, however, to enter upon this much-disputed question, I shall, for the sake of convenience, consider the chronic forms of these affections together.

Judging from the mass of observations which have now been published in the different German periodicals, and from what I have heard and seen connected with this subject, I am inclined to consider that the Cod liver oil is more especially indicated in three distinct forms of chronic gout and rheumatism, which may be denominated the general, erratic, and local forms.



1. *General form.*—In these cases where the gout or rheumatism appears to have seized upon the whole system, and where, as the result of long suffering, the body is wasted, the process of nutrition very low, there is want of sleep, loss of the vital powers, peculiar cachectic expression of countenance, and contraction of the muscles, the oil is of the greatest benefit. Among other cases Brefeld describes that of a woman, Mrs Meermann of Hamm, 30 years old, who had been confined to her bed or room, and only in the warm summer months experienced a slight alleviation of her sufferings. Nearly the whole body was attacked, but principally the inferior extremities, sacrum, back, and shoulders. Walking was entirely prevented by the insupportable pains, stiffness, and swelling of the joints. A kind of hectic fever, and constant nightly exacerbations destroyed all repose. The patient was wasted, of a bleechy whiteness, of a cachectic appearance and habit, and had lost all hope of relief, although originally she was of a strong and robust constitution. The use of two table-spoonfuls of the oil daily, was soon followed by a beneficial result. After taking forty ounces she was restored to a tolerable state of health, although the malady, by the conjoint influence of numerous unfavourable circumstances, such as a moist and confined lodging, bad nourishment, uncleanliness, &c., did not entirely disappear. The

woman, after this, voluntarily took the oil for the space of a year, and was, three years from the time he first saw her, perfectly healthy, well nourished, blooming, and of robust appearance, although, during changes of the weather, she felt a slight stiffness in the limbs.[1]

For the following case I am indebted to Dr Frech of Baden Baden.

### Case I.

*General articular rheumatism—Stiffness of the joints—Contraction of the extremities—Failure of the usual remedies—Ol. jecoris aselli—Cure in ten days.*

Catharine B———, 19 years of age, of a scrofulous family and external appearance, had, in the beginning of May 1837, a violent attack of acute rheumatism, induced apparently by washing a room. All the joints of the upper and lower extremities were affected, but more especially those of the elbows and knees. This attack was removed after some weeks by venesection and the internal administration of aconite. In August she was again exposed to cold, and was again attacked with violent pains in the extremities, which, as formerly, were

[1] Brefeld, p. 42.



more acute in the knee and elbow joints. The usual remedies were applied by the medical men who attended her without success. The pains remained the same, the power of moving the joints became less and less, and the patient wasted rapidly. In order to support the strength the decoc. cinchonæ was ordered, and taken for two weeks. Dr Frech saw the patient for the first time in the middle of September. She lay in bed, was of cachectic appearance, much wasted, and found it impossible to rise. The pulse was accelerated, soft and small; her urine clear; there were violent piercing pains in the upper and lower extremities, which were strongly contracted and flexed. The movements of the joints were limited, especially in the elbows and knees, and all attempts at flexion or extension caused the most excruciating suffering. In this case she remained two weeks longer, when she was ordered to take three table-spoonfuls daily of the ol. jecoris aselli in aq. menth. pip. The dose was increased to four table-spoonfuls in three days, and to six table spoonfuls in six days. On the third day there was a perceptible alleviation in the pains, which from that time gradually disappeared, while the natural movements of the joints returned. On the tenth day she was entirely free from suffering, and moved the upper and lower extremities without the slightest uneasiness. Dr Frech has not seen the

patient since, and presumes from that circumstance, that she has had no return of the complaint.

*Remarks.*—This case is a good instance of the rapid and beneficial effects occasionally produced by the oil, and is the only one I have met with where such decided results were obtained in so short a time.

2. *Erratic form.*—In this form the pains are less violent, and the movements of the affected parts, although restrained, are not abolished. Usually it is only some portions of the limbs which are affected, most commonly the hand, foot, and knee, which are sometimes swollen and œdematous. The pain and swelling are often changeable, leaving one part of the body in a few days, and appearing in another. The pain is increased in the night and in moist weather. This affection, popularly called flying gout or rheumatism, often remains for months, is accompanied by a pale appearance of the surface, diminution of the digestive process, loss of appetite, occasional feverish symptoms, depression of mind, and general suffering. In such cases the ol. jecoris aselli is of the most decided benefit, and, according to some physicians, is infallible. Rubbing the oil warmed into the affected parts, and covering them with wadding has been found useful in conjunction with its internal administration. Brefeld says that he has met with a crowd of such cases, all of which are cured to a certainty by the oil, in a period varying from fourteen days to four weeks. Among others he gives that of Olivie von R——, a girl 14 years of age, well grown and nourished, of a scrofulous and rheumatic family, inhabiting a moist and badly-situated lodging. She suffered for some time from a painful swelling which changed about between the hand, foot, and knee-joints, sometimes was longer continued than at others, occasionally disappeared altogether, and then returned. Some bottles of the oil cured the girl so completely that not a trace of the affection remained, and it has never returned.[1]



3. *Local form.*—Here the affection is local, confined to a single part, such as a limb or joint. Many of these cases are very obstinate, and individuals who otherwise enjoy tolerable health are rendered miserable on the approach of damp weather, which invariably increases their torments. This form of the disease is of a more acute nature than the preceding, and is generally induced by an improper or inert mode of treatment during the acute attack, or a continued exposure to the causes which originally produced it. It is most common in individuals who have previously enjoyed good health, and who do not take sufficient precautions against damp and cold. The ol. jecoris aselli has been found capable

[1] Brefeld, p. 45.

of curing this local form of the disease, when every other means have failed.

For the two following cases I am indebted to Dr Herrght of Heidelberg, assistant physician to the asylum in that town.

### Case II.

*Chronic lumbago, succeeding an acute attack—Scrofulous constitution—State of cachexia—Moxas and blisters without effect—Ol. jecoris aselli—Cure in three months.*

Margarite C——, aged 37, of a weak and scrofulous constitution, has been in the asylum of Heidelberg since 1825 on account of periodical attacks of mania. She has menstruated regularly, but had fluor albus for some time. In December 1837, the appetite diminished, the catamenia assumed a dirty coloured appearance, and there was evident difficulty in walking. She often placed her hand on the sacrum as if to support it, and complained of pain in the neighbourhood of the sacro-iliac synchondrosis. Her walk became gradually more and more difficult. Every movement of the foot was painful. She could not go in or out of bed without assistance. At the same time both hips felt abnormally moveable, and



during progression her body fell from one side to the other over each foot. The application of six moxas to the sacral region, and the use of pills containing assafœtida and phosphoric acid somewhat improved her condition, so much so that the walk became more easy and free from pain. In the spring of 1839 however, the disorder returned more violently than before. Blood extracted from the sacral region by means of cupping, and the application of another six moxas which were kept open some time by irritating dressings, in no way relieved the patient. In the beginning of June the ol. jecoris aselli was given, at the commencement in doses of one tablespoonful, afterwards two tablespoonfuls three times a day. At first it was vomited several times, but she soon became accustomed to its use, and took it willingly. At the end of July, that is nearly two months after taking the oil, her walk was much improved, the appetite had returned, and her external appearance was less flaccid, and looked much more healthy. By the end of August her bodily health may be said to have been quite restored. Her natural strength had returned, her cheek was blooming, her walk was straight and fixed, and she could take promenades of an hour's duration without fatigue, or any ill effects. She continued to take the oil until the end of October 1839, and up to this time (Feb. 1841) there has been no return of the complaint.

## Case III.

*Chronic lumbago of several years' standing—Difficulty in walking—Cachexia with œdema—Ol. jecoris aselli—Cure in seven months.*

Mrs S——, aged 48, of leucophlegmatic temperament, menstruating regularly, has had monomania and hallucinations for several years. Formerly she was much subject to gastric disorder, and for some time has been labouring under fluor albus, which has been accompanied with great flaccidity of the vagina, and small erosions round the os uteri. For several years she had complained of lancinating pains in the region of the sacrum, and experienced more or less difficulty in walking. For a long time there has been a great disposition to diaphoresis, which has latterly become habitual and very copious, possessing at the same time a peculiarly unpleasant and penetrating smell. Within the last few weeks the walk has become exceedingly difficult, and her body, during progression, is swayed from one side to the other. The neighbourhood of the sacro-iliac synchondrosis on both sides was exceedingly painful on pressure, and the hip joints were evidently more moveable than usual. As the local affection increased



the general health suffered more and more, the countenance at length assumed a dirty yellow hue, the appetite was greatly diminished, and the whole surface of the body was more or less œdematous.

In September 1839, she commenced taking the ol. jecoris aselli, combined with the decoc. centaurium minoris, the use of which was continued until March 1840. The dose at first taken was a table-spoonful three times daily, and afterwards four times. The patient took it very well after the disgust which it at first occasioned had disappeared. In two months a considerable amendment was perceivable. The pain in the sacral region was diminished, although sometimes augmented by changes in the weather. The walk became more steady, and did not occasion so much suffering. The profuse sweating diminished, its disagreeable odour disappeared, the œdema was no longer to be seen, and the whole aspect of the patient was changed for the better. Towards the end of the treatment the pains in the limbs and sacrum entirely disappeared. The sacro-iliac synchondroses became more firm and free from pain, while the walk lost its abnormal character, and was performed without difficulty. The general appearance also was quite healthy, and the diaphoresis no longer perceivable. The fluor albus also had considerably decreased. This good state has continued until now (Jan. 1841) with the exception of some slight pains,

which she once experienced in the back and arms, and which rapidly disappeared under the use of the vin. sem. colchici.

*Remarks.*—Both these cases are very similar to each other, the affection apparently being situated in the ligaments and fibrous tissues of the coxo-sacral articulations, which were abnormally loose and flaccid. In both cases, also, the general constitution had suffered, and a highly cachectic state induced, that state, indeed, in which the oil, from experience, has been found to be so beneficial. Its action, in restoring the appetite and nutritive powers, was well marked, and as these improved the local affection proportionally diminished. It should also be observed, that in one case the disease was not so chronic, or deeply rooted in the system as the other, and did not require so long an employment of the oil to eradicate it from the constitution.

Brefeld has taken great pains to point out that there exist a variety of affections which very much resemble rheumatism, and yet which, not being of a rheumatic nature, are in no way benefited by the oil. Thus, according to him, all arthritic and neuralgic cases are incapable of receiving any benefit from this remedy. There can be no doubt that it often requires extraordinary tact on the part of the physician to decide whether he has to treat an affection originating in gout, rheumatism, or neuralgia. This is sometimes perhaps impossible, as these affections run so gradually into each other, more especially in the chronic forms, that the symptoms are absolutely identical, while the same exciting cause and habit of body may be common to them all. It is not my object here to enter into a description of the diagnostic characteristic of these diseases. They are all given very clearly in books, and appear, on perusal, to be very easy. The practitioner, however, to whom this memoir is addressed, knows very well that while, on the one hand, cases occur which are readily recognised, there are, on the other, instances in which it is almost impossible to determine whether it be the fibrous or nervous tissue which is originally affected. The following case, which was communicated to me by Dr Krukenberg of Halle, will illustrate this point.



### Case IV.

*Sciatica—Atrophy of the affected limb—Cupping, mercurial ointment, and blisters without effect—Ol. jecoris aselli—Cure.*

Dr B——s, 25 years of age, assistant in the Clinical Hospital of Halle, who had previously suf-

fered from several attacks of rheumatism, experienced, in December 1837, violent pains in the right thigh, which exactly followed the course of the ischiatic nerve. The pain shortly extended to the toes, but was not more violent at the hip or knee than in other portions of the limb. There was a remission of the pain during the day, but it recurred every evening, and was most violent at midnight. Although by no means sensitive, the patient was unable, from the violence of the pain, to sleep, or obtain any rest until morning. At this period the limb did not present any apparent change. At first the case was considered one of inflammation of the ischiatic nerve, and blood was drawn by means of cupping from various places in its neighbourhood three or four times. Every other day he took an emetic. This treatment only caused temporary relief, and a short time after every blood-letting it returned with the same violence. Mercurial ointment was then rubbed into the thigh in the course of the nerve, without producing any amelioration of the pain. On the contrary, it augmented the bad state of the patient, by inducing a mercurial eczema. No better success followed the application of blisters.

This treatment occupied three weeks, without having occasioned any diminution in the patient's sufferings, and latterly the thigh had rapidly diminished in size, and was now one-third less in diameter than the



opposite one. At this time Dr Krukenberg read accidentally the treatise of Rust, in which he describes the success he met with from the use of ol. jecoris aselli, in a case of ischias of similar violence.[1] The

[1] The following is the case alluded to, which deserves notice on account of so celebrated a practitioner as Rust having recorded it, as well as from the intrinsic value of the case itself.

"One of our most celebrated civil officers, Herr Oberbergrath Schaffrinski, had already suffered several weeks from what appeared to be a perfect *ischias nervosa*, which he considered was attributable to exposure to cold. He had also employed an anti-rheumatic treatment, but without success, when I was consulted. I ordered venesection, the repeated application of leeches and scarifications, frictions with mercurial ointment, and internally small doses of tartar emetic, and later, repeated emetic and purgative remedies. All this occasioned no relief, nor was the employment of volatile liniments, the application of blisters after Cotuni's method, or a trial of antispastic and emollient remedies of every kind, attended with better success. After some months' useless treatment, I was under the necessity of accompanying the escort of the deceased Prince of Hardenberg into Italy, and left the patient under other professional care. On my return I found him in a truly deplorable state, although he had not neglected to demand the advice of the most respectable and experienced Berlin physicians, and tried every thing that rational or empiric means could devise, which held out a hope of relief. I have seen few patients with such uninterrupted suffering. For nearly sixteen weeks he had been unable, from pain, either to walk, to sit, or lie down, but was obliged to continue day and night leaning against the back of a chair, in a half-standing, half-bent position, with the legs fully stretched out, while every change from this position induced the most excruciating agony. In spite of every contrivance that could be thought of to make this inconvenient position bearable to the patient, the pressure had produced several sores on the breast and arms, which greatly increased his sufferings. Under these circumstances the idea, for the first time, occurred to me of trying the Cod liver oil, and in this most obstinate affection, when there had been tried, during seven months, general and local bloodletting, alkaline, mercurial, and russian baths, the cold douche, frictions of every description, blisters and moxas, emetics and purgatives, as well as the internal

patient was quite willing to take it after the method prescribed by Rust. He drank, accordingly, every morning, during the remission of the pain, 4 oz. of the oil, and after the first few days experienced some degree of alleviation. He continued its use for three months without using any other remedy. In six weeks after commencing to take the oil he was enabled to pursue his duties in the hospital, and while he gradually lost the slight pain which remained, the strength and normal size of the limb returned. He took the large dose of the oil described, with black coffee, and the functions of the stomach were in no way deranged.

*Remarks.*—In this case there existed an intermittent violent pain, following the course of the ischiatic nerve, and it is not astonishing that these symptoms should be referred to some change in the nervous tissue. The patient, however, had previously suffered from attacks of rheumatism, and the ordinary treatment for neuralgia was productive of no benefit. Wasting of the limb at length appeared, and the disease was evidently augmenting when the ol. jecoris aselli was given. From that time, however,

employment of opium, ipecacuanha, sublimate, turpentine, camphor, aconite, belladonna, &c.; I was enabled to bring about, by eight doses of the oil, so much benefit, that the patient could walk backwards and forwards in the room without pain, and take at night the necessary rest in bed. He was perfectly and permanently restored to health." *Aufsatze und Abhandlungen aus dem Gebicte der Medicin*, &c., von Dr T. Rust, Berlin, 1836, 2te. Band. s. 180.



an amendment appeared, so that there can be little doubt it is to the oil that the cure must be attributed.

Whether the ol. jecoris aselli is as beneficial in cases of chronic gout as in rheumatism may still be considered a question *in dubio*. This, however, cannot be said of neuralgia, for not only does our knowledge of the pathology of this affection render it very unlikely that the oil would be beneficial, but actual observation may be said to have demonstrated it. Brefeld and other writers, for instance, have recorded several cases where the oil was taken for a long time without effect, and which subsequently recovered under the use of tonics, sedatives, derivatives, &c. Professor Romberg, of Berlin, whose extensive practice, and particular attention to nervous diseases render him a great authority on this subject, also informed me that, after numerous trials, he had never seen it beneficial in a case of undoubted neuralgia. Is the success of the oil, therefore, capable of assisting our diagnosis in these cases? This question, in the present state of our knowledge, I shall not attempt to answer. It appears to me, however, that one conclusion may be drawn from the foregoing remarks, viz. that the non-success of the oil in chronic rheumatism may, in several in-

stances, be attributable to the faulty diagnosis of the practitioner, and its consequent inapplicability to the case under treatment, rather than to the absence of therapeutic power in the remedy itself. Many medical men are very willing to give any new remedy a trial, but are also very ready to pronounce it inert should their expectations after the first few experiments not be fully answered. Let me hope that the diagnostic difficulties connected with the disorders under discussion may induce them to pause before forming a rash opinion, either confirmatory or condemnatory of its alleged therapeutic properties.

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## SECTION VI.

### ON THE EMPLOYMENT OF THE COD LIVER OIL IN SCROFULA.

The use of the Cod liver oil in scrofula, particularly when complicated with rachitis, appears to have been first known to the profession in Holland. In the year 1822, the Society of Science and Art in Utrecht had made the chemical and therapeutic pro-



perties of this substance, the subject of a prize essay.[1] Since then the observations of Schenk,* Schütte,* Busch,[2] Gumpert,[3] Fehr,[4] Rösch,* Beckhaus,[5] Schmidt,[6] Knod von Helmenstreit,[7] Munzenthaler,[8] Gunther,* Wüste,* Ruef,[9] Behn,[10] Roy,[11] Gouzée,* &c., &c., have fully established its great value in the various forms of this disease.

Most of the early symptoms of scrofula, which are best observed in children, may be traced to some fault in the process of digestion. Thus, the first symptom is an irregularity in the appetite, then follows cardialgia, more or less intense, vomiting of sour coagulated alimentaceous matter, while similar coagulated masses and sour fluids pass by stool, which are variously coloured by the bile. If these symptoms continue, the abdomen often commences to enlarge, and to become more thick and firm, and, in proportion as it increases in size, the extremities, especially the inferior, diminish in volume and firm-

* See p. 74, 75.

[1] Hufeland's Journal. Bd. 56, s. 128.

[2] Med. Chir. Zeit. Bd. 4, s. 205.

[3] Med. Zeit. herausgeg. vom Verein f. Heilk. in Preussen. 1838, No. 33.

[4] Verhand. der ärztl. Gesellsch. der Schweiz, 1823.

[5] Rust's Mag. Bd. 20, s. 189.

[6] Ibid. 35, s. 38.

[7] Hufeland's Journ. Bd. 74. Heft. 5. s. 33.

[8] Ibid.

[9] Schmidt's Jahr. Bd. 13. s. 305.

[10] Diss. de oleo jecoris aselli, præsertim in coxarthroxaciæ efficacia. Berolini, 1833.

[11] Julius u. Gersons Mag. f. d. ausl. Litt. d. gesammt. Heilk. Bd. 16. s. 298.

ness. The skin loses its tungor, becomes flaccid and wrinkled, a change readily perceived in the countenance, which receives a peculiarly old expression. Through the walls of the abdomen firm pressure may often detect swollen glands deeply seated, and those in other parts of the body also become enlarged. At last there appears an eruption on the skin, occasioned by the effusion of albuminous matter into the cellular tissue of the integuments. This matter, conjoined with a small portion of fibrine and earthy salts, constituting scrofulous or tubercular deposition, may also be effused in different forms into other organs, whereby their functions suffer more or less derangement. If effused into the lungs, it occasions phthisis pulmonalis; if into the bronchial glands, it is a frequent cause of catarrh; if into the membranes of the brain, it is not an unfrequent cause of acute hydrocephalus; if into the brain itself, different forms of paralysis follow; if into the serous membranes, acute dropsy, ulceration, producing phthisis laryngea, diarrhœa, blennorrhœa, &c., according to the seat of the lesion; if into the external glands, different kinds of so-called scrofulous swellings; if into the mesenteric glands, atrophia, mesenterica; if into the bones, caries, Pott's disease, tabes dorsalis, white swelling of the joints, and dependent on the caries, ulcerations in the skin; if into the cellular tissue of the integuments, lupus, tœnia, eczema,



impetigo, and various scrofulous eruptions, &c., &c.; thus, in the advanced stage, scrofula appears in different individuals in various forms, and hence it is that the ol. jecoris aselli has been found useful in what may at first appear widely different maladies.

Although the oil is beneficial in most scrofulous affections, its good operation is much more apparent in some than in others. Thus it is exceedingly useful when the osseous texture is attacked, as in the different degrees of rachitis, affections of the joints, spina ventosa, and caries. It is equally serviceable when the vasa lactea and mesenteric glands are more particularly affected, especially if atrophy be present. In this case, indeed, it appears to be the only means of cure at present known. Its operation is less remarkable and swift in scrofulous eruptions of the skin, ophthalmia, ottorhœa, &c., while it is least beneficial in affections of the external glands, more particularly if ulceration have not commenced. Brefeld gives the case of a girl, who, at the same time, laboured under caries in the bones of both hands, and a moist scaly eruption on the fore part of the neck and one arm. In a few months after taking the oil, the disease in both hands was perfectly cured, while that in the neck remained stationary. This, however, also at length disap-

peared on conjoining with the internal exhibition of the oil its external application to the affected parts.[1]

Many scrofulous affections may occur in different individuals, under two states of the constitution which it is very necessary to attend to in a practical point of view. The first is a florid and healthy constitution, the individuals are fat or well-nourished, and the digestive organs perform their functions with tolerable regularity. The second is a cachectic constitution, the skin is more or less of a pale dirty colour; the individuals are thin, have either excessive or diminished appetite, considerable derangement in the digestive organs, and are evidently not well nourished. It is when the last-named symptoms are present, that the oil is more especially indicated, and has been found to produce such beneficial results. In the former state of the constitution, on the other hand, and in many cases which appear little capable of being benefited by the oil, the administration of iodine has been found most useful. Thus the scrofulous engorgements of the lymphatic glands in the neck, though not readily cured by the oil, often quickly disappear after frictions with an ointment containing ioduret of potash. For the following case, which well illustrates the

[1] Op. cit., p. 20.



advantage of attending to this point, I am indebted to Dr Hildebrand of Berlin.

### Case V.

*Fatuity following epileptic attacks—Hemiplegia—Symptoms of scrofula, but strength of patient good—Probable tubercle in the brain—Ol. jecoris aselli given without effect—Iodine administered with great benefit—Epilepsy removed—Appearance of cough and atrophy.—Ol. jecor. aselli again given, and disappearance of the latter symptoms.*

Matilda Ludeke, a well-nourished fat child, four years old, was brought to the clinical wards of Professor Barez in la Charité Hospital, Berlin, 13th of April 1839, labouring under an imperfect paralysis of the tongue, the left arm and foot, the latter contracted. It appeared that the child, when in her first and third year, had had one attack of convulsions, which, according to the description of the mother, appeared to have been eclampsia. In its fourth year there had been six attacks of true epilepsy, which returned every two months, and always during the night. The epileptic attacks at first commenced with an icy coldness of the body, and fixity of the eyes, but latterly they have been preceded by cries,

and since the affection has taken this form, a marked change has appeared in the child's intellectual powers. The patient laughed and cried without any apparent motive, took no notice of surrounding objects, and gradually became idiotic. She passed urine in the chamber, eat ravenously like an animal, and struck people and things about her.

These symptoms were still present, and besides the paralysis previously mentioned on the left side, a farther examination determined that the child had never spoken, and laboured under habitual constipation. Since the epilepsy has returned regularly, she has lost the power of standing, and is now unable to walk. All attempts at progression, even while supported, are accompanied by a trailing of the affected leg; while, from the state of contraction of the limb, and flexion of the knee, the toes only reach the ground. The left arm is also contracted, and she is unable to hold anything in the hand. Some of the lymphatic glands of the neck are considerably swollen, and on the head are several crusts of tinea. The appetite is very great, but she does not appear capable of masticating well, as she retains the food a long time in the mouth. She takes very little liquid. From the symptoms above-mentioned, epilepsy was diagnosed, depending on the deposition of scrofulous matter, (tubercle) in the right hemisphere of thebrain. There was apparently no



change in the mesenteric glands, as the child appeared to be well nourished.

Under these circumstances the ol. jecor. aselli was given and continued several months in large doses, viz. two table-spoonfuls night and morning. The remedy removed the voracious appetite, but otherwise occasioned no beneficial results. Iodine was now given after the form of Lugol, and from this time the state of the patient improved. The child became less uneasy, took more notice of surrounding objects, appeared to possess more consciousness, recognised persons, moved the tongue with more facility, and even attempted to utter some words. After some months' employment of the iodine, during which period its use was occasionally abstained from for a short period, and other remedies given to combat particular symptoms, the paralysis disappeared, she could walk perfectly, speak with facility, and even commenced to learn the alphabet. The epileptic attacks ceased to return, but a certain degree of fatuity, or limitation of the intellectual faculties, continued. At this time the iodine appeared to affect the constitution, the appetite diminished, she became much thinner, and a teazing cough made its appearance. The ol. jecor. aselli was now again given, when the cough soon ceased, and in a few weeks the strength of the system had entirely returned. She is now (March 1841) free from all

bodily complaint, and the mental faculties are daily gaining strength.

*Remarks.*—This case is very important as indicating the relative value of iodine and the oil. Although a scrofulous disposition was evident, which had apparently proceeded to tubercular deposition in the brain, the general strength was not diminished, and the functions of the digestive organs were not deranged to any great degree. In this state the exhibition of the oil was of little service, because it was not necessary to augment the nutritive action, which for the most part appears to be a necessary prelude to its successful operation. Indeed, almost all the cases I have seen, in which the oil was of marked benefit, laboured under a general or local atrophy. Iodine, on the other hand, caused a great improvement in this case, and evidently induced absorption of the foreign body on which the symptoms depended. At length, however, the patient became thinner, and the nutritive functions were evidently affected. Here then the oil was directly indicated, and, when given, produced its usual beneficial results.

The long-continued use of iodine tends to produce atrophy, and loss of the general strength. The Cod liver oil, on the other hand, leads to the removal of atrophy, and induces augmented power in the system generally. The great value of these remedies therefore, as antagonists to each other, in the two



distinct forms of scrofula which present themselves, and the occasional change from one to the other, as circumstances indicate, will be readily conceived by the practitioner. Dr Bardsley, so long ago as 1807, when speaking of the oil, remarks, "the fact certainly is, that patients who have for some time taken this remedy, are disposed to increase in bulk and fatness, and it scarcely ever was attended with decisive advantage without producing these effects in a greater or less degree."[1]

## Rachitis.

Many physicians and writers on this subject consider rachitis as essentially a scrofulous disease. This opinion is, however, erroneous. I have seen several cases of rachitis in which no symptom of scrofula was present, and that such is the case is fully acknowledged by many practitioners in Germany, and by the later researches of M. Guerin of Paris.[2] It cannot be denied, however, that in by far the majority of cases this disease is complicated with scrofula, and it would appear that under such circumstances it is most readily cured by remedies which are directed to a removal of the scrofulous complication.

Rachitis is essentially a disease of childhood, sel-

[1] Medical Reports, p. 20. [2] Dublin Journal, No. 54.

dom appearing after the third year. According to the observations of M. Guerin, it passes through three distinct stages, which may be distinguished by their symptoms, and the alterations occurring in the osseous tissue. He denominates these stages those, *first*, of incubation or effusion, *second*, of deformation, and, *third*, of resolution or eburnation. The first stage is distinguished, according to him, by the phenomena of general fever, derangement of the gastro-intestinal tube, diarrhœa, flatulent distention of the abdomen, and a marked sensitiveness of the whole osseous tissue. The second, by the swelling of the ankles, knees, and wrists, and subsequent deformity of the bones; the constitutional symptoms are also increased. In the third stage the general symptoms diminish, the epiphyses of the bones return to their normal size, and the bones become consolidated. He also seeks to establish a law, that the deformity invariably proceeds from below upwards, and that isolated deformity of the superior portions of the skeleton, when none exists in the parts below, is not owing to rachitis.

From what I have seen of this disease, on the contrary, I consider that rachitis is not always distinguished by swelling of the joints and bending of the bones, but may be indicated by a want of development of the teeth, and a retardation in the closing of the fontanelles. In these cases acute



hydrocephalus often arises from the irritation of teething, the symptoms of which I think have been transformed by M. Guerin into the first stage of rachitis. It is singular, also, that M. Guerin, throughout his memoir, makes no allusion to the influence of rachitis on the development of the teeth, and on the closing of the fontanelles, a proof that he has not paid any attention to these points. In opposition, also, to the law M. Guerin wishes to establish, I may remark, that I have seen rachitic deformity of the chest without any curvature in the inferior extremities. In this form of the disease the ribs are pressed together, causing a diminution in the cavity of the chest, constituting the pectus carinatum. Thus, whenever there appears to be an arrest in the development of the teeth, or even closure of the interior fontanelle, it is important to examine the children naked, a neglect of which rule, it appears to me, has often caused the true nature of the disease to be overlooked.

With a view to treatment, rachitis may be divided into two forms, viz., rachitis simplex and rachitis scrofulosa. In the first form the children are strong, fat, and have a healthy external appearance, only the anterior fontanelle remains open, they have few teeth, and sometimes the epiphyses of the long bones are thickened. In the second form, in conjunction with the latter symptoms, and more or less

deformity of the osseous system generally, there is always a cachectic constitution, the external appearance of the child is very miserable, it seems to be improperly nourished, has engorgement of the cervical or other external glands, and, in short, presents all the appearance of scrofula. In the first form the ol. jecor. aselli is inert,[1] but in the second its beneficial operation is most striking. So many cases of the complete cure of this disease by the oil have now been published, and so many others are daily occurring, that in Germany they no longer excite attention, and are considered as the usual result of every-day practice.

[1] I have seen the following treatment for simple rachitis employed with great success by Professor Barez of Berlin, in his clinical wards. It commences with bitters, followed by absorbents combined with aromatics. The form is

R.—Ext. Taraxaci . . . ℥ss.
Aq. Fœniculi . . . . ℥iv.
Liq. Kali Carb.
Tr. Rhæi Vinosæ . . a. a. ʒj. ɱʃ.

Of this mixture a tea or desert-spoonful may be taken three or four times daily according to the age. If, by these means, the appetite is improved, and the bowels become regular, iron is given in the following form.

R.—Tr. Ferri Pomadæ . . . ℥ss.
Tr. Rhæi Vinosæ . . . ʒj. ɱʃ. Ft. Mist.

of which ten drops may be taken morning and evening, gradually increased to thirty, or even forty drops, until the child can run. Baths of malt and hops may then be taken, in order to strengthen the integumentary system, and act as a tonic, and lastly, chalybeate baths. The diet, from the beginning, should be very nutritious, consisting of meat, white meat soup, eggs, and beer soup (caudle). Every morning acorn coffee. See note, p. 127.



In Heidelberg, where rachitis is very common, every medical man I asked respecting it was ready to give me numerous instances of its success. Professor Naegele informed me that he had given the oil in more than a hundred cases with the best results. Dr Steinhaeuser of that town has also employed it in many cases, and has been good enough to give me the following account, as the result of his observations of this remedy in the cure of rachitis. The opportunities enjoyed by this gentleman of treating the disease have been very great, and I translate the communication he made to me literally, as it contains a condensed and clear account of the operation of the oil in this affection.

"I will give you," says Dr S., "the result of my observations, with reference to the beneficial action of the ol. jecor. aselli, in rachitis complicated with scrofula, having given it to many children when labouring under that disease, with the best effects. At first there appears to be a greater degree of activity in the nutritive functions. The appetite becomes more natural; the excretions per alvum more regular; the swollen and distended abdomen flatter and more soft; the dirty white colour of the integuments and general scrofulous appearance disappear; the soft parts generally receive more turgor vitalis, the muscles more tone, and the swollen glands, should any exist, gradually return to their normal size.

Concerning its favourable action on the bones, I have remarked, that after taking the oil for some weeks, (but sooner or later according to the degree of the disease), that the swollen, protuberant epiphyses of the bones, especially those of the radius and ulna, become thinner, and, together with the osseous substance generally, more compact. The curvature occasioned, in the softened bones, by the weight of the body and muscular action, as, for instance, in the under extremities and vertebral column, gradually disappears of itself, if it has not already reached a very high degree. The one-sided flattening of the thorax, recovers its rounded form, and the angular prominent sternum becomes again flat. The prominence of the forehead disappears, the fontanelles close, and the head loses it large, mis-shaped, and angular appearance. The development of the teeth proceeds with ease and in a more perfect manner, and every part of the child's frame exhibits a greater degree of activity. The children no longer sit silent, apathetic, and immoveable, but their attention is attracted to what passes around them, and they seek to get up and move, or regain the power of locomotion, should they have previously possessed it."

"I have seen the oil produce a similar good effect in other osseous scrofulous affections of the bones, especially caries. It renders better and increases chylification and assimilation, and operates



in every case by stimulating, enlivening, and strengthening the digestive canal, its lymph vessels and glands, and this more especially on the latter through the agency of the iodine it contains. Whether it has a specific operation on the osseous system cannot be said, but its remarkable effects in rachitis, sufficiently show that it has a powerful and deep influence on the human economy in general, and above-named tissue in particular."

"Regarding the method in which it should be taken, I give daily from one to two ounces, and, to make it less nauseous for the little patient, and more digestible, I add an aromatic water, for instance, ag. minth. pip., white sugar, and gum arabic, so that the whole assumes the form of an emulsion. When the glands are more especially affected, the addition of other antiscrofulous remedies is necessary, and I give, if the season allows, herb baths, and cause a light animal diet to be observed."

Dr STEINHAEUSER, in Heidelberg,
September 9th, 1840.

As an instance of the good effects of the oil in individual cases of this disease, I may mention shortly one, the particulars of which were communicated to me by Dr Kobelt, of Heidelberg.

### Case VI.

*Rachitis in its advanced stage—Considerable curvature of the long bones and spine—Ol. jecor. aselli.—Cure.*

The son of Mr O——, an advocate in Heidelberg, when two years of age, showed all the symptoms of rachitis, in its worst form. On account of the considerable and apparently increasing curvature of the long bones in general, but more especially that of the vertebral column, Dr Goetzenberger was consulted, who advised the mother to take the child for some time to her native place, Varel, in Oldenburgh, by the North Sea, where the benefits of sea-bathing might be obtained. On arriving at this place, however, the continued bad weather rendered the employment of sea-bathing impossible, and during her residence in this sequestered locality, principally among sailors and fishermen, she was induced to give the child internally the Cod liver oil, which was there a popular remedy, and which she was not aware had ever been administered by medical men. This medicine, however, soon produced so remarkable a change for the better in the child's health, that she willingly continued it, and after nine months' employment of the oil, he appeared to be perfectly cured. I have myself often seen the boy since, and he enjoys the most vigorous and robust health.[1]



### Malacosteon.

This disease differs from rachitis in its never appearing before puberty, in occurring more often in women than in girls, and most frequently in those who have had children. Men have also been known to labour under it, but this is rare. It is most commonly met with affecting the pelvis, when it commences with deep-seated pains in the loins and thighs, often of a very acute nature. The pain is always increased on motion, and hence the disease is generally mistaken for gout or rheumatism. Fever is seldom present, and the urine contains a sediment,

[1] The manner in which M. Bretonneau, of Tours, was induced to give the oil in this disease deserves notice. He had treated the rachitic child of a rich Dutch merchant with preparations of iodine and other means, for some time, without success. He was then told by the father that the elder children had previously suffered under the same malady, and had been cured by the Cod liver oil, which, in Holland, was a popular remedy. Bretonneau gave the same substance to his young patient, and was much struck with the very rapid and successful result which followed. He commenced making researches with it on other patients, and it was only then that he learnt for the first time what had been written by the German authors on this subject. He has since given it extensively in rachitis, with the happiest results. This fact was communicated to the Société de Médecine, de Paris, in 1837, by M. Roche. See Journ. de Méd. et de Chir. Pratique, Mars 1837, and Traité Therapeutique par Trousseau et Pedoux, vol. 2, p. 261.

consisting of phosphate of lime. The patient sooner or later is under the necessity of remaining in bed, and the trunk ultimately becomes shorter, when there can remain no doubt regarding the nature of the disease.

Dr Hull, among the notes added to his translation of Baudelocque's Memoirs on the Cæsarian operation,[1] relates the following case. "Ellen Gyte, of Ashton-under-Line, was married at the age of 23, and was delivered of her first child in her 24th year. She bore her second child before she was 25. In this pregnancy she began to be afflicted with pains, especially about her hips and loins, which were supposed to be rheumatic. After the birth of her child, she grew very lame, insomuch that she was obliged to walk upon crutches for about two years, and to be carried to and from bed. Two years and a quarter afterwards, when she was in her 28th year, she was delivered of her third child. She now began to take a table spoonful of Ling liver oil every night in a tea cupful of warm ale, and her body was rubbed all over with it once a-week. During the first sixth months she derived no sensible benefit from this plan; but, by persisting in it for nearly half a year longer, her pains went off, and never returned, except from taking cold. She became able to walk without assistance, and never afterwards had occasion to use either crutches or stick."

[1] Manchester, 1801, p. 159.



I am inclined to suppose that this disease is by no means so rare as is generally thought, more especially that form of it which occurs in women after lying-in, and which consists of more or less softening of the pelvic bones. Such individuals are generally considered to be labouring under chronic gout, rheumatism, or neuralgia. Professor Naegele, of Heidelberg, related to me the following case:—A woman who had had several children suffered for several years great pain in the region of the sacrum, lower part of the back, and thighs. Every medical man in Manheim had been consulted, and during that time she had almost exhausted the materia medica in a fruitless search after a cure. Professor Naegele was consulted, and asked her if she had become shorter lately. She answered yes, and was apparently astonished at the question. Malacosteon was diagnosed, and the ol. jecor. aselli given. In six months all pain had left her, and she has since remained well.

Hoebeke, of Sottegem, states that he has observed malacosteon follow the employment of the ol. jecoris aselli in ten women, who had previously had natural labours.[1] Delavacherie and Simon have observed similar cases following the use of Huile de Poisson.[2] It appears evident to me, however, that these gentle-

[1] Bulletin Méd. Belge, Fevr. 1838, p. 46, and Archiv. de la Méd. Belge, Jan. 1840, tom. 1. p. 28.

[2] Annales de la Société de Méd. de Gand, and Journ. des Conn. Méd. Juin. 1839.

men have been entirely deceived in attributing the production of malacosteon to the oil. There can be little doubt that the rheumatismal pains for which the oil was originally given were, in point of fact, the symptoms of the malacosteon, which had already commenced.

## Scrofulous Caries of the Bones.

Scrofulous caries is at the same time a general and local disease, and it is in vain attempting to cure the latter without improving the former. It is in this point of view that the Cod liver oil is so valuable, and has been given by Brefeld, Kopp, Knod von Helmenstreit, Knolz,[1] Dieffenbach, Jüngken, Taufflied, and a variety of practitioners with the best results, first improving in such cases the general cachectic diathesis, and then causing the caries in the bones and ulcerations in the integuments to cicatrize. The judicious practitioner, however, will not neglect, during the internal administration of the oil, to make such local applications as the nature of the case may in his opinion render necessary. Thus leeches, if the parts are swollen, inflamed, and painful; the occasional application of compression; stimulating the surface by a lotion composed of ℥ij of ioduret of potass, to ℥ij of water; frictions with

[1] Hufeland's Journ., Bd. 39. Heft. 4, s. 10.



an ointment composed of ℥vj of ioduret of potassium to ℥ss of lard., as recommended by Taufflied; or the local application of the oil itself, as advised by others, may in different cases be useful, and facilitate the cure.

Among several instances of its success, Brefeld mentions the case of a woman whose arm was swollen three times the natural size, was of a fiery red colour, and highly painful. Eight large openings, with swollen, raised, and spongy edges, led into a large carious cavity, from which was continually discharged, on all sides, a profuse, fetid, and irritating matter. A probe sank half its length into the substance of the swollen bone. Hectic fever had prostrated the general strength, and induced great emaciation. Amputation of the limb was recommended by the medical man in attendance as the last and only means of saving her life, which she refused to submit to. At this time Brefeld was called in, who found that in her early youth she had suffered from several scrofulous affections, had had swelling of the glands, and eruptions on the head. He did not think, from the general scrofulous constitution, and extreme state of the patient, that amputation was admissible. He considered the disease incurable, but, with a view of satisfying the patient, he gave the oil internally, and applied cooling dressings to the arm, and from that time it began to

improve. The fever, swelling, redness, and pain, together with the fetid sanious discharge, gradually disappeared, and her appetite and general strength proportionably increased. The ulcers healed one after the other; four of them, however, being only encrusted over, and constantly bedewed with a slight fluid secretion. After some months the arm was diminished to its natural size, and an anchylosis of the elbow joint established. Four years subsequently she was in good bodily health, but some crusts still remained on four of the ulcers, which were kept moist by an unimportant fluid secretion.[1]

Knod von Helmenstreit gives the case of a boy, six years of age, in whom a hip-joint disease (Coxarthrocacæ) was produced by a fall on the knee. Numerous external and internal remedies were employed without checking the progress of the disease. The affected limb at length became shortened, and an abscess opened on the fore part of the thigh, the matter from which was very profuse, and so acrid as to inflame the parts over which it passed. The boy's constitution now suffered greatly, he fell into a state cachexia, with hectic fever, and death appeared inevitable. The ol. jecor. aselli was given at this time, at first in the form of clyster, as the extreme weakness of the patient rendered it probable that it would not be retained on the stomach, but subsequently it was ad-

[1] Op. cit. p. 106.



ministered in the usual way. After five or six days a slight improvement was perceptible, and from this period the hectic state and other symptoms gradually disappeared; the discharge of matter diminished, and ultimately ceased, and in six months and a half a perfect cure was established, and the fistulous ulcer healed. The limb however remained shorter than the opposite one.[1]

The following case is recorded by Taufflied[2]:—A young man aged 18 years, affected with caries of the lumbar vertebræ had been treated in vain by the ordinary external and internal remedies. A vast abscess was formed in the sacro-lumbar region: the paralysis of the inferior extremities was almost complete, and marasmus and hectic fever apparently announced a fatal termination. The oil was prescribed without expectation of any benefit in a case so desperate. It operated, however, beyond all anticipation, and produced a total change in the patient. The paralysis of the inferior extremities gradually disappeared; the patient, who could scarcely move himself in bed, raised himself on his legs, and walked with considerable facility; he regained his robust appearance, and the hectic fever entirely disappeared. Pressure on the lumbar vertebræ ceased to be painful, the tumor of the sacral region, in which fluc-

[1] Hufeland's Journal, Bd. 74. Heft. 5. s. 39.
[2] Gaz. Méd. de Paris, 1837, p. 503, and same Journal, 1839.

tuation had been decidedly evident, diminished in volume, but remained stationary about the size of a fœtal head for two months. It then gradually lessened in size, and in the month of January 1838 had entirely disappeared. In June, however, pains again returned in the lumbar region, and a new collection of matter formed about the size of an egg. On again administering the oil, these symptoms also left him, and a complete cure was established. At present the spinous processes of the two first lumbar vertebræ are some what prominent, but progression is normal, and the health perfect.

I have seen two cases of scrofulous caries which appear to me to have been cured by the oil.

### Case VII.

*Paedarthrocacæ—Scrofulous constitution—Glandular swellings in the neck—Swelling of wrist-joint, with caries of the bones and discharge of tuberculous matter—Ol. jecoris aselli.—Cure.*

An infant named Robert Linde was weaned when about three months old, on account of the secretion of milk in the mother ceasing. Shortly after, he was brought to Prof. Barez's clinique in La Charité Hospital, Berlin, suffering from catarrh. He was



also much emaciated, and laboured under general febrile excitement. Leeches were twice applied to the chest, and light antiphlogistic and refrigerating remedies employed, but without alleviating the cough. Diarrhœa also now appeared, followed by great prostration of strength, so that the child could not remain upright in the nurse's arms. The skin assumed the yellow cachectic appearance so common in scrofulous children, and the glands in the neck became somewhat swollen. One or two of these enlarged considerably, and from the time the affection assumed more of a local form, the general health commenced greatly to improve. The swellings, however, gradually disappeared under the use of warm applications. The child was not brought to the clinique for a space of two months, during which time, according to the report of the mother, it enjoyed good health. At the expiration of this period, however, when the child was six months of age, a red and hard swelling formed on the back of the right hand, situated on the upper part of the metatarsal bones, and partially covering the wrist joint. When again brought to the clinique there was in addition a considerable degree of fever, with diarrhœa, the abdomen was swollen, the limbs and body otherwise much emaciated, and the general appearance highly cachectic. To combat the fever and irritation light cooling regimen was ordered with neutral salts. In a week these

symptoms with the diarrhœa disappeared, but in the mean time the swelling on the hand had opened, and discharged a quantity of thin watery fluid, containing tuberculous matter, which when squeezed or rubbed was found to be of a cheesy consistence. The opening was about the size of a small pea, and on introducing into it a probe, the bones below were found rough and evidently carious. The ol. jecoris aselli was now ordered in teaspoonful doses twice or three times daily. In a few weeks a great amendment had taken place, the surface assumed a better colour, he appeared stronger, and enjoyed a good appetite. From this time the matter discharged gradually diminished in quantity, and after three months the aperture had completely healed up, and the child might be said to be well. The bones of the wrist, however, still appear (Feb. 1841, three months subsequently) somewhat thicker than those of the left, but this no doubt will diminish as the child grows up.

*Remarks.*—In this case the scrofulous diathesis, arising from insufficient nourishment, terminated in the local deposition of tubercular matter in the bones, and formation of caries. It will be observed that diarrhœa, with symptoms of general irritation, existed, which were first removed by proper regimen and treatment. *Then* the ol. jecoris aselli was given with the best effects. In all such cases it is



necessary to attend to the contra-indications, among which the presence of diarrhœa is, in children, a very important one, and it is only after first removing these symptoms, and placing the digestive organs, and system generally, in a sufficiently powerful state, that the oil is admissible.

The second case, as it extended over a long period of time, is necessarily greatly condensed. The patient's and parents' accounts were so confused that I had recourse to Dr Hildebrand, under whose care the patient for some time was placed, and to whom I am in a great measure indebted for the few antecedent details now mentioned.

### Case VIII.

*Scrofula — Tinea capitis — Coxarthrocace — Great emaciation, and danger of sinking from exhaustion— Ol. jecoris aselli — Improvement in the general health—Termination of the osseous disease after going through all its stages, in the formation of a false hip joint—Spondyloarthrocaceæ, which equally went through all its stages, and terminated in anchylosis of the vertebral bones, and acute curvature of the vertebral column, in its cervical portion.*

A girl named Möring, who, when I first saw her,

was 17 years of age, dated her first illness five years back, when she suffered from tinea capitis. Shortly afterwards she entered the Clinical Hospital of Berlin, under Prof. Barez, labouring under incipient disease of the hip-joint, as indicated by the inability of resting on the left limb, difficulty of moving the joint, pain in the knee and on pressure under Poupart's ligament. At this time she presented all the symptoms of a scrofulous constitution, but the general health was not greatly affected. The usual treatment in such cases was employed, consisting of local bloodletting, followed by moxas and other derivatives. The disease of the joint, however, continued to make slow but certain progress, and the affected limb became longer than the other. As the local disease advanced, the general health became affected; she lost her appetite; the countenance and surface of the body assumed a highly cachectic appearance; there was hectic fever, great wasting, and in short every thing indicated approaching dissolution. At this time, about eighteen months after entering the hospital, she was ordered to take the ol. jecor. aselli in table-spoonful doses, morning and evening, which was subsequently to be increased. The friends, however, imagining that she would die in the hospital, took her home, avowedly in order to prevent a post mortem examination. In the mean time, the limb which at first was longer than



the unaffected one, commenced to shorten, and shortly after being at home, and still continuing the use of the oil, the general health greatly improved. In two years and a half from the commencement of her complaints, and about six months after taking the oil, a false hip joint was fully established, and the left leg was six inches shorter than the other. There was, however, no longer pain, the health was good, the appetite had returned, and the general functions of the system were performed with regularity. It was ascertained that for some months after leaving the hospital, the ol. jecor. aselli was almost the only substance of a nutritive nature that she took at all. The oil was now discontinued, and she enjoyed good health for three or four weeks. At the expiration of this time, however, she complained of pain in the neck, which gradually increased, and assumed all the characteristics of that, accompanying caries of the cervical vertebræ. Deglutition was painful; the slightest movement of the head caused great agony, and it remained fixed and immoveable in consequence. At length, during every slight movement she was obliged to make in bed, or even when any one was walking across the room, the hands were applied to the head in order to support it, and prevent it pressing on the vertebræ below. These symptoms continued about four months, notwithstanding the application of leeches,

cupping, followed by moxas and other derivatives, and she was rapidly falling into the state of marasmus, from which she formerly recovered, when the ol. jecor. aselli was again given. In four weeks there was an evident amendment, and the acute pain gradually diminished. Three months subsequently there was no longer pain, but the neck was bent forwards, and the fourth, fifth, and sixth cervical vertebræ became prominent. In ten months more the head was thrown forwards and downwards on the chest and between the shoulders, and the length of the trunk greatly diminished. Complete anchylosis had taken place between the bodies of the fourth, fifth, and sixth cervical vertebræ, the spinous processes of which bones formed a very acute curvature posteriorly. There was, however, no pain, the head possessed its power of rotation, and the general health was good. During the whole of this time she continued taking the oil, with the exceptions of occasional intermissions, when other tonics were given in order that the digestive organs and appetite might not be affected. It was in this condition I saw her during the winter of 1840, and 1841. She could then walk with crutches, suffered no pain either in the left hip-joint or neck, and her general health was good. She had not yet menstruated, and although seventeen years of age, had the height and appearance of a girl eight years old.



*Remarks.*—This must certainly be considered as a remarkable case of osseous tubercular deposition, but one which may possibly leave some doubts regarding the influence of the oil. We find, however, that in this case, the patient had fallen into such a state of weakness and prostration, as to indicate approaching dissolution. This was so evident even to the parents, that she was removed from the hospital in order that their prejudices might not be shocked by a post mortem examination of the body. This then is a certain evidence of the improper manner in which the nutritive functions were performed. At this period the ol. jecor. aselli was given, and the improvement coincides with the time of its administration. Thus we find in this as in other cases, that it acted by improving the digestive powers, and the strength so communicated to the constitution, enabled nature to carry on the changes which remove the disease in the osseous structure, and substitute a healthy although abnormal state in its stead. The tendency to tubercular deposition, however, was not extinguished, and some of the most important bones in the frame were attacked, viz. the fourth, fifth, and sixth cervical vertebræ. The state of cachexia was returning, when the oil was again administered, which occasioned an improvement in the general health as before, and

enabled the disease here also to go through all its stages, and terminate in anchylosis. Numerous cases undoubtedly exist where a hip-joint or a vertebral disease has occurred, and terminated in the same way, although no oil was given. There are few, however, where such important structural lesions as those above detailed, and continuing so long a time, have terminated so favourably, after the general strength had been so much reduced as to render death almost certain. Reasoning, therefore, without prejudice, and viewing it in conjunction with other instances of its action, I do not consider myself erroneous in attributing much of the beneficial results to the administration of the oil.

It is not always, however, that the ol. jecor. aselli produces such striking results. I saw a case in Heidelberg of caries of the ribs, in which the oil had been taken for a long time without any beneficial result. But in another of spina ventosa in the same town, in which it had been taken for several years, although the local affection had not been healed, the profuse and fetid discharge, hectic fever, and colliquative sweats had been diminished, and the patient's strength and external appearance muchimproved.

In chronic white swellings of the joints the oil has produced similar results to those just mentioned.



In acute cases the inflammatory symptoms should always be combated by bleeding and antiphlogistics previous to administering the oil.

### Atrophia Mesenterica.

In no disease, with the exception of rachitis, are the good effects of the ol. jecor. aselli so well established as in this. In these cases, indeed, it is often very striking in its operation, curing the disease when every other remedy has failed, and even when all hopes of the patient's life have been abandoned. The following case, treated by Dr Nebel of Heidelberg, is a good illustration of the advantages of the oil in this dangerous malady.

### Case IX.

*Atrophia mesenterica in its most advanced stage—Great swelling of the abdomen—Hectic fever—Failure of tonics and other [remedies—Ol. jecor. aselli.—Cure.*

Carl Happold, a native of Manheim, whose father died of phthisis, enjoyed during infancy sound health. As he approached his fifth year, however, it was observed he had no appetite, that the stools became

irregular, and that diarrhœa and constipation often alternated with each other. A short time after the commencement of these symptoms he became very thin, and the abdomen rapidly enlarged. The medical men who were at this time consulted, treated the case as one of phthisis, and considered the swelling of the abdomen attributable to dropsy. During the space of a year several kinds of treatment were had recourse to, principally of a tonic nature, and various bitters and quinine were persisted in for some time, without making any impression on the disease, which continued to make rapid progress. At length the mother was informed that nothing could save the child, and the medical men of the town refused seeing him more. Under such circumstances the mother brought the child to Heidelberg, who, on the 4th of May 1840, presented the following symptoms:—He was six years of age, and presented in a most marked degree the appearance of a confirmed scrofulous and cachectic constitution. There was a peculiar expression of suffering in the face, and extreme emaciation of the whole body The abdomen was enormously swollen, and in circumference was double the normal size. The abdominal integuments were not hard but exceedingly distended, with large purple prominent veins running in their substance. The surface was covered with numerous fissures similar to those often seen on



the abdomen of pregnant women. Here and there hard, deep-seated, irregular swellings varying in size, could be felt on pressure. He suffered under great weakness, was unable to walk or even to support himself in an upright position, and complained of pain in the limbs and abdomen. He had no appetite; the tongue was clean; the stools irregular; the pulse quick and weak, and in short he had all the symptoms of hectic fever. Atrophia mesenterica was diagnosed, and the mother informed that although the child was dangerously ill, there was still some hope. Rejoiced to find that there was some probability of saving her only child, the mother took lodgings in Heidelberg to place him more especially under Dr Nebel's care. ℥ss. of the ol. jecor. aselli was ordered to be taken morning and evening; acorn coffee as a beverage,[1] and ext. cinchonæ ℥ss. daily, in four doses, with an aromatic water. The secretions and excretions also were to

[1] *Glandes quercus tostæ.—Acorn coffee.* When the continental system of Napoleon continued, the high price of genuine coffee led to the substitution of this substance, and it was observed that the health of adults, as well as of children, especially among the lower classes, was rendered much better by its use. If cachexia were present, the colour of the cheeks became more healthy, the body stronger and better nourished, and the general sufferings attendant on scrofula, which are so common among the lower orders, were greatly alleviated. It agrees remarkably well with the constitution of children, and as a slight astringent, somewhat nourishing, and powerfully tonic remedy, is especially indicated where torpor and laxity are predominant. It acts exceedingly well as a slight stimulant to the intestinal canal, and hence is adopted to remove the

be carefully attended to, and medicines were occasionally given directed to their promotion or diminution as circumstances required. In a fortnight he no longer complained of pain in the limbs or abdomen. At the termination of three weeks the excretions were pretty regular, and he was ordered to be daily carried into the open air, and to use an ointment containing ten grains of the hydriodate of potass to ℥ss. of lard, of which a piece the size of a bean was to be rubbed into the abdomen twice daily. Shortly after he could support himself, and at the end of five weeks could walk tolerably well. The abdomen was now sensibly diminished in size, more soft, and the integuments were not so stretch-

cachectic state in children, with a swollen and pale countenance, enlarged lips and nose, thickened abdomen, and flaccid integuments.

The good operation of this substance depends much on its mode of preparation. The acorns must be ripe and healthy, and none should be taken which have been attacked by worms. They should be cut in cubes about the size of a coffee berry, then dried, roasted, and ground. If during the roasting they become burnt and black, (as may easily occur) their therapeutic action is destroyed. A well-prepared acorn coffee should be of a brown colour, and from the presence of an empyreumatic oil should possess a pleasant and refreshing smell. By the addition of a fourth part of true coffee, it receives also an agreeable taste. It is best to prepare a large quantity of the acorn, thus mixed with the true coffee, and keep it in a well-stopped earthen or glass vessel, so that by occasionally shaking them together, the former may be completely saturated with the aroma of the latter. Of such a mixture half an oz. may be boiled for ten or fifteen minutes in three ordinary sized tea-cupsful of water, one of which a child might take morning and evening, or three times daily.—Tourtual, Therapie der Kinderkrankheiten. Bd. 2. s. 29.



ed. From this time he rapidly became better, the countenance assumed a fresh and healthy aspect, the appetite returned, and the secretions and excretions were carried on with regularity. Towards the termination of the sixth week he was ordered a warm bath daily of 25° Reaumur, each bath having dissolved in it a pound of the crude salt left after cristallization in mother water. After using the baths a week their temperature was gradually lowered, and he was ordered to remain continually in the open air, and exercise himself in jumping, skipping, &c. At the end of the second month the ointment was omitted. He was now strong, ran without difficulty, grew rapidly, and laughed and played with pleasure. All enlargement of the abdomen had disappeared by the end of July, (third month) and he returned to Manheim quite recovered. Shortly after he was so strong that besides running about in the day, he could walk from Swetzingen to Heidelberg, a distance of five miles.

*Remarks.*—The desperate state to which this patient was reduced, and the subsequent swift recovery, renders it a matter of importance to determine whether this is to be attributed to the oil. Those who are inclined to doubt its therapeutic properties may ascribe all the benefits occasioned to the iodine contained in the ointment. Dr Nebel, as a

practical physician, acted judiciously in combining all the remedies which appeared to him most likely to cure his patient. Indeed, it is only by acting in this manner, and combining with the exhibition of the oil a proper treatment, that it can ever be expected to cure such desperate cases as the one just detailed. The circumstance, however, which proves that the cure is principally to be attributed to the oil, is the evident amendment which had taken place before iodine was in any way administered. He took it three weeks with ext. cinch. alone, and at the termination of that time all pains in the limbs and abdomen were removed, and the excretions were more regular. Here, then, the process of amendment had already commenced, and it was only with a view of assisting the action of the oil that the ointment containing hydriodate of potash was administered. The subsequent management of the case shows that nothing was omitted that could tend to the patient's recovery, and its treatment throughout exhibits great practical tact and skill on the part of the physician.

Dr Mencke of Pyrmont communicated to me a case so similar to the above that I have not thought it worth while to detail it at length. Indeed, since the properties of the ol. jecor. aselli have become known, such cases are by no means uncommon in Germany. The son of this gentleman fell a victim



to atrophia mesenterica, and I shall not readily forget the regrets he expressed at not having been previously acquainted with a medicine which he considered to be almost a certain remedy for the disease.

## Phthisis Pulmonalis.

It must be acknowledged by every one, that if there be one form of scrofulous disease more uniformly fatal than another, that form is undoubtedly phthisis pulmonalis. Perhaps, also, there is no opinion connected with medicine more deeply rooted among the profession and the public than that consumption is incurable, an opinion that extended observation has hitherto only tended to confirm. And yet it has been demonstrated by Laennec,[1] Andral,[2] Cruvelhier,[3] Louis,[4] Rogée,[5] Kingston,[6] and several others, that even tuberculous cavities in the lungs are not invariably fatal, and are susceptible of being cicatrized like other lesions of structure. This fact is now universally acknowledged. It is only considered, then, by most individuals, that therapeutics

[1] Traité de l'Auscultation. Observations, 19, 20, 21, and 23.
[2] Clinique Medicale. Tom. 4, p. 369, et seq.
[3] Thes. ad aggregat, 1823. An omnis pulmonum exulceratio vel etiam excavatio insanabilis.
[4] Recherches Anatomico-pathologiques sur la Phthisie, pp. 32 et 35.
[5] Archiv. Gen. de Med. Tom. 5. 1839.
[6] Medico Chir. Trans. 1837. Vol. ii. 2d Series, p. 327.

can lay little claim to this most wished-for result, an opinion expressed by Andral in the following words.[1] "No fact," he says, "demonstrates that phthisis has been ever cured, for it is not art which operates in the cicatrization of caverns, it can only favour this, at most, by not opposing the operation of nature. For ages remedies have been sought either to combat the disposition to tubercles, or to destroy them when formed, and thus innumerable specifics have been employed and abandoned in turn, and chosen from every class of medicaments." Such authority, supported by the universal experience of the profession, might well induce the physician to despair of curing his patient. Why, however, may not the remedy which has been found capable of curing tubercle in the bones and mesenteric glands operate also favourably when tubercular deposition has taken place in the lungs? Supposing that we are enabled to strengthen the nutritive functions so as to permit the system to support or overcome the depression and exhaustion which precede death. Nature, under such circumstances, will, at all events, have a longer time to operate, and may be even stimulated to produce resolution of the lesion by the improved state of the general system. It is not, however, by supposition that such a question is to be decided, and I shall endeavour to show

[1] Dict. de Med. 1st Edit. Phthisie.



that certain parts render it probable that this beneficial result may be occasionally induced by the administration of the ol. jecor. aselli.

Henkel[1] was the first who tried the oil in cases of tubercular lungs with success. Häser[2] has published an account of several cases in which it was given with the best results. He remarks, as the result of his observations on thirty-two individuals in whom he had detected the presence of tubercles in the lungs by auscultation as well as by the general symptoms, that the ol. jecor. aselli is by far the most useful remedy in those cases where tubercles have not yet softened, or even where they are in the first stage of softening. Alexander treated a case of phthisis in which a vomica with perfect pectoriloquy was detected under the right clavicle, by means of the oil, with a successful result.[3] Asmus also records the case of a man who presented all the symptoms of consumption, with an excavation in the apex of the right lung as was proved by the stethescope. He completely recovered, and died subsequently of apoplexy.[4] Kopp, Kolkmann, Brefeld, Richter, Schenk,[5] and other practitioners, in their writings on this subject, also bear testimony to its great value in this disease.

[1] Med. Zeit. vom verein für Heilk. in Preussen, 1833, s. 222.
[2] Hufeland's Journal, 1833, Jan. s. 103, und August, s. 107.
[3] Ibid. 1838, Juni s. 3.
[4] Mediz. Zeit, No. 22, 1841, and Kleinert's Repertorium, Mai 1841, s. 96.
[5] Hufeland's Jour. Bd. 89. Heft. 2. s. 57.

Delcour observes, "it is certain, that by its employment we have been able to prolong the existence of many phthisical individuals, already arrived at the last degree of marasmus, and that many physicians of Verviers have informed us that they had observed the same effects under its influence. We have seen the colliquative diarrhœa and sweats arrested, the digestive functions re-established, and the cough and expectoration diminished, until new softenings have arrived to carry off the patient. We believe then, that this medicine deserves to occupy a distinguished place in the treatment of pulmonary phthisis, and that it at least deserves a farther trial."[1]

Professor Osann of Berlin assured me that he had given the oil in several cases of phthisis pulmonalis with the best results, and in one case, that of a woman who was in the last stage of the disease, and whose state appeared to be perfectly hopeless, a complete recovery was brought about by its means. I was informed also by Dr Wolf, Clinical Professor in the University of Berlin, in a conversation I had with him on this subject, that there could be no doubt regarding the utility of the oleum jecoris aselli in phthisis pulmonalis. He has found it of great service in the second stage, where tuberculous matter was spit up, but where the hectic had not reduced the system to a great degree. It is true that many

[1] Archives de La Méd. Belge. Tom. i. p. 272.



individuals labouring under the disease die. The remedy is no certain specific, but a sufficient number have recovered to assure him that the oil is of great value in such cases. Neither he nor Professor Schönlein have found it beneficial in the third stage of the disease, where caverns exist in the lungs, and there is extreme emaciation, hectic, and prostration.

Such is the recorded and oral information I have been enabled to procure in connexion with this subject. I now request attention to the following cases.

### Case X.

*Hemoptysis—Irritating cough of four years' standing—Hectic fever—Ol. jecor. aselli.—Cure.*

Dr A——, now (Nov. 1840) 26 years of age, blond, high-shouldered, light-coloured countenance, suffered in the autumn of 1836 from spitting of blood, followed by a troublesome cough, which continued without remission winter and summer. Towards morning there was often profuse sweatings, so that his strength was much diminished, and he became evidently more thin. During the four following years these symptoms gradually increased, and he

had occasional return of the hemoptysis notwithstanding every possible kind of treatment that could be thought of had been followed. At the termination of this period the colliquative sweats and cough were much augmented, and he was greatly emaciated. In the course of the summer of 1840, he commenced taking the ol. jecor. aselli in doses of a tablespoonful four times a-day, and continued it until the autumn. At the beginning of October his appearance was healthy, his strength had returned, he had no cough or hemoptysis, and in short was so well that he was on the point of marriage.

*Remarks.*—This case or rather notice of a case is exceedingly imperfect, and did it exist as an isolated fact would be evidently of little value. In the present state of our knowledge, however, I did not think it right to reject it. The symptoms which here more particularly indicate tubercular deposition are the hemoptysis, the long-continued cough not affected by season of the year, the colliquative sweats and emaciation occurring in an individual of a scrofulous diathesis.



## Case XI.

*Epilepsy — Hemoptysis — Pneumonia — Cough with discharge of muco-purulent sputa—Hectic fever—Failure of the usual remedies—Ol. jecoris aselli. —Cure.*

—— Rauchfusz, a carpenter aged 28, blond, belonging to a scrofulous family. In his youth he was generally healthy, but about the age of puberty attacks of epilepsy appeared, which still continue, but at long intervals. Three years ago he had itch, which was cured in a few weeks by the application of sulphur ointment. In Hamburgh, where he worked, during the winter of 1840 he was attacked with violent spitting of blood, had pains in the breast, strong fever, and was several times bled and cupped. He had then all the symptoms of pneumonia, and entered the great hospital in Hamburgh. From the treatment there pursued the inflammatory symptoms and hemoptysis disappeared, but the recontinued cough, a feverish state, sweatings, and in consequence great weakness. He remained six weeks in the Hamburgh hospital, where the local bleedings were repeated, followed by blisters, but without any good result. He left Hamburgh in the spring, and returned to his relations in Halle. At this time there was great wasting; every evening, shivering and heat followed by

sweats; considerable cough, and some degree of œdema in the feet. The sputa was very profuse, and of a mucopurulent nature, but free from tubercular masses. Percussion discovered nothing,—auscultation detected mucous and submucous rales in the superior third of both lungs, and in the right fossa supraspinata, the vocal resonance was much louder than in the left. There was strong hectic fever; profuse sweatings, and frequent teasing cough, with roughness in the larynx. His health did not improve during the course of the summer, in which local bloodletting, blisters, anodynes, expectorants, and the usual remedies given to phthisical patients in general were administered. About the middle of summer he had a return of the hemoptysis, and two epileptic attacks. The prognosis now was that death could not be far distant, as he did not sleep, the œdema was much increased, and the digestive process was much deranged, while from the long continuance of the disease also there appeared little to hope. At this time the ol. jecor. aselli was ordered in doses of 2 oz. daily which were afterwards increased to 4 oz. Shortly afterwards there was an amendment perceptible, and from that time all the symptoms above detailed gradually disappeared, so that three months after commencing to take the remedy he was perfectly restored to health.

*Remarks.*—The particulars of this case are much more perfect than those of the last, and the cough,



expectoration, colliquative sweats, emaciation, and physical signs can leave little doubt that tubercular deposition had taken place in the lungs, and had proceeded either to the termination of the first or commencement of the second stage of their development. Both these cases were communicated to me by Dr Krukenberg, nephew of the celebrated professor of that name, in Halle, a gentleman who possesses great practical information, and who has for a long time acted as assistant physician in the Clinical Hospital attached to the University.

### Case XII.

*Tubercular lungs—Vomica under the right clavicle—Hectic fever, and great prostration—Ol. jecoris aselli—Temporary improvement.—Relapse.*

A young man, 17 years of age, who had for several years suffered under hereditary tubercular phthisis, came into the hospital of Stuttgard, labouring under the third stage of the disease. On examining him with the stethescope, a large vomica was readily detected under the right clavicle, with loud cavernous respiration, and perfect putoriloquy which forcibly struck the ear. There was extreme emaciation, profuse night sweatings, hectic fever, and

cough, want of appetite, and great loss of strength, so that the patient could scarcely leave his bed. He was ordered to take the ol. jecor. aselli three times daily, in table spoonful doses, which he did readily, and even seemed to have a predilection for the remedy. In thirteen days there was a remarkable improvement in his condition, and the dose was increased gradually to 4 oz. daily, without its producing any disagreeable effects. The first amendment to be remarked in him was an improvement in the appetite, which was gradually so increased that one could scarcely give him enough to eat, and he readily digested the strongest kind of nourishment. He also rapidly increased in strength, so that he could remain the whole day out of bed; the night sweatings disappeared; his appearance was more lively and fresh, and although the muscular system did not increase in volume, it became more firm. The cough diminished without entirely disappearing, and in eight weeks the patient seemed to be quite another individual from the one who entered the hospital. He now appeared to have received from the oil all the benefits it was capable of bestowing. At this time every dose occasioned disgust and nausea, and took from him all appetite, so that it became necessary to discontinue its use. After two weeks it was again given in smaller doses, but without producing its former good effects, and the patient again



gradually fell into the state in which he first entered the hospital. When in Stuttgard, last September, I myself examined this patient, and readily detected the cavity in the lungs above described, the physical signs connected with which, Dr Cless, the attending physician, assured me underwent no change during the course of the above treatment.

*Remarks.*—No one will doubt the existence of tubercular deposition, and destruction of the lung in this case, and yet the good effects resulting from the administration of the oil were well marked. It is probable that, had the physician been acquainted with the necessity of not overloading the system, attending to the state of the digestion, and when this appeared to be deranged, of giving other tonics, he might have ultimately recovered. This case strikingly exhibits the power possessed by the oil, of stimulating the nutritive functions, even in individuals labouring under the third stage of the disease.

## Case XIII.

*Periodic Mania—Periostitis over the olecranon, with caries—Cough, with purulent bloody sputa—Cavern in the superior third of right lung—Hectic fever—Ol. jecoris aselli—Gradual return of the strength, and disappearance of the local and general disorder.—Cure.*

Marguerite E—, aged 35, a servant, of scrofulous constitution, had been in the Heidelberg lunatic asylum since October 31, 1834, on account of periodic mania. In January 1838 she complained of a short teazing cough, which, during the subsequent six months, underwent no perceptible amelioration, and latterly had been attended with slight expectoration. On the 6th of June, she, for the first time, called the attention of the physician to a hard, red, immoveable tumour, situated over the right olecranon, which was painful on pressure, and prevented her fully flexing or extending the limb. Notwithstanding the repeated application of leeches and frictions of mercurial ointment, the swelling increased, involved the whole elbow joint, became at last fluctuating over the olecranon, opened of itself, and discharged a quantity of thin purulent matter, mixed with bloody streaks. Examination with a



probe shewed that the olecranon was divested of periosteum, and uneven on its surface. The general swelling of the joint continually increased. The condyles of the humerus were augmented in size, and a thin yellow fluid was discharged from the opening, sometimes mingled with blood. The pain was very considerable, and excruciatingly increased on any attempt to straighten, flex, or elevate the joint. During the progress of these local symptoms the cough had much increased, the expectoration was bloody and purulent, and very profuse. The sweatings became more abundant, and all the symptoms of hectic fever appeared one after the other. Auscultation detected cavernous respiration under the right clavicle, with dulness on percussion. During thee xternal use of fomentations and chamomile bath applied to the elbow, and internally Rust's pills of assafœtida and phosphoric acid, which, with slight variation, were continued for five months, the situation of the patient became worse and worse. Under these circumstances the ol. jecor. aselli was given in November, 1838, with the decoc. centaurium minoris. Four table-spoonfuls were at first taken daily, which were gradually increased to eight. At the commencement it was necessary to suspend its use for a half or even a whole day, on account of the vomiting it occasioned. This, however, soon ceased, and the remedy was regularly taken afterwards, until the

6th of October, 1839, together with acorn coffee, and the external application, to the elbow joint, of chamomile fomentations and poultices. During this period, which was of nearly a year's duration, it was observed at first that the swelling of the elbow was sometimes diminished, and at others increased, the latter more especially during the period of menstruation. It was at such times also more red and painful, and secreted a more abundant discharge. The constitutional illness, however, was much improved. The sweatings disappeared, the cough and expectoration were diminished, and the latter became free from blood and pus. The cachectic appearance of the patient also was much improved, and she was evidently better nourished, and daily increased in strength. After a three months' use of this remedy, the swelling, redness, and pain of the elbow commenced to diminish, the discharge gradually became less and less, and after a time entirely ceased. The arm by degrees regained some degree of mobility, and in September 1839, the wound was completely healed. At this time the patient appeared quite healthy; there was no longer any cough, or other symptoms of pectoral affection. Under the right clavicle, however, there was still heard a distant cavernous respiration, but there was no mucous rale, and percussion on this side gave as sonorous a tone as that on the other. Since then the cicatrix over



the olecranon has become strong, and densely united to the bone, and the elbow joint, in which an incomplete anchylosis has taken place, is not thicker than that of the left arm. There are no night sweats, and before the termination of the autumn the patient presented all the external appearance of perfect health.

I learnt the above particulars of the case from Dr Herrght, the assistant-physician of the asylum. I myself examined this patient several times during the summer of 1840. The elbow joint was permanently bent at an obtuse angle, but she could perform rotation and supination of the fore-arm. In every other respect she appeared to enjoy perfect health, and I was unable to detect either by percussion or auscultation any thing abnormal in the chest.

*Remarks.*—In this case also all the constitutional as well as physical signs of phthisis were present, and the operation of the oil is well marked, as in the last, by improving the general state of the system. In this instance, however, a permanent cure followed; and that this good result is attributable to the remedy, cannot, I think, be doubted, if we reflect on the state of the constitution before it was given, the subsequent gradual amendment, and, moreover, compare it with the effects produced in the last case. Here the results were more gradual but permanent, in the other more rapid but temporary. It must

also be sufficiently apparent that the oil does not operate on the lungs in particular, but on the general pathological state of the system, on which the local lesion depends. In short, it cures phthisis in the same manner as it cures other scrofulous affections. The proof of this is, that the patient suffered at the same time under a scrofulous caries of the bones forming the elbow joint, which was equally removed by the same remedy.

For the history of the following case, I am indebted to Dr Dommes, of Berlin.

### Case XIV.

*Phthisis—Ol. jecor. aselli—Recovery—After twelve months, return of cough—Pleurisy on left side,—then on the right side—Exhaustion—Decubitus—Death—Old cavity in the left lung apparently healing—Fresh tubercules in the right lung, with effusion of lymph in the pleural cavity.*

Edward Spock, inhabiting a dark and confined lodging, according to the account of the medical man who had previously attended to him, had suffered from his seventh to his ninth year from cough, with the usual symptoms of phthisis, and towards the end of that period great emaciation had taken place.



At this time he was ordered the ol. jecor. aselli, at first in two tea-spoonful, afterwards in two table-spoonful doses, twice daily. He continued its employment for about twelve months, and gradually lost all cough, became stronger, appeared more robust, and towards the end of his eleventh year enjoyed good health.

Dr Dommes was first called in when the boy was twelve years and six months old, and found a lad of a scrofulous and rachitic constitution, with a well marked phthisical habitus, as demonstrated by the long curved nails, long eye-lashes, &c.; the cough had returned within the last six months, but without much expectoration, and the appetite had remained good, and the bowels regular. He was now labouring under fever, the pulse was frequent and weak, and he could obtain no sleep. He complained of a sharp pain in the left side of chest inferiorly, increased on taking a deep inspiration. Auscultation detected at the summit of the left lung, cavernous respiration with perfect pectoriloquy, no cavernous rattle. Posteriorly under the inferior angle of the left scapula, a loud friction sound was heard both during inspiration and expiration. A normal respiratory murmur was at the same time heard in both lungs, and percussion gave the same tone on both sides. Six leeches were applied under the left scapula, and antiphlogistic remedies given, by means of which

the fever abated and he became somewhat better. In fourteen days there was another attack of pleurisy, accompanied with fever, quick and weak pulse, furred tongue, constipation, pain in the right side, cough and expectoration. A space the size of the hand in the inferior portion of the right side of the chest was slightly dull on percussion, and a friction sound was clearly heard immediately above it. In the left lung a vomica was still evident as before. The respiratory murmur, except in the places above mentioned, was normal on both sides. Leeches were ordered to be applied to the painful part in right side of chest, and internally the bowels were to be operated on by means of sulphate of magnesia. He again improved, but a week subsequently he was seized suddenly at night with dyspnæa, and increased pain in the right side. The heart also beat violently, the cheeks were flushed, and the pulse was frequent but not strong. He was bled 4 oz., and the liq. kali. acet. given. This produced a temporary relief, but in twenty-four hours the dyspnæa returned, and soon increased to orthopnœa. The extreme difficulty of breathing, however, left him the next day, and he became gradually better, so much so, indeed, that at the termination of a week he could sit up. He had now slight fever every afternoon, but neither now or during the progress of the case did colliquative sweats make their appearance. He now took small doses of



quinine. which removed the afternoon fever, and he continued free from any acute illness, and comparatively well for four weeks. At the termination of that period he was again seized with dyspnæa, which, in two or three hours, became extreme. The heart beat violently with a strong impulse, but without any abnormal sound. From percussion the dullness in the cardiac region was considered to extend over a somewhat larger space than usual. It appeared that he had not slept for several nights past, the scrotum was somewhat œdematous, and the secretion of the urine diminished. He was again bled to 6 oz., and was ordered to take digitalis internally. For four days he was better, and then had a return of the symptoms just described. He thus continued better and worse alternately for two weeks, during which he had very little sleep. The saliva, also, ran from his mouth involuntarily, from want of power to expectorate it. Great exhaustion was now present, and decubitus. Latterly the scrotum became much distended, and the fluid was evacuated by means of a puncture. He took, during this time, the tr. digitalis, and the tr. opii benzoica. In this state he continued still eight days, when death took place.

*Autopsy twenty-four hours after death.*—The body was much emaciated. In the left lung, near the summit, was a cavity about the size of a walnut,

quite empty. Its inner surface was dry, and of a dirty brownish colour, somewhat resembling that of a smoked ham. Its walls were not lined by any adventitious membrane, but were composed of the substance of the lungs in a condensed and considerably indurated state. Neither in the neighbourhood of this cavern, nor in any other part of the left lung, were any traces of tubercle to be found. Posteriorly and inferiorly there were some old adhesions uniting the pleura together. The whole of the right lung was studded with tubercles from the size of a pea to that of a bean. They were of a yellowish colour, of hard consistence, and appeared to have been freshly deposited. Posteriorly and latterly there was a considerable effusion of coagulable lymph in flakes adherent to the lung. The bronchia were natural, containing only a little mucus. There was slight hypertrophy in the left ventricle of the heart. The liver was much enlarged, yellow, and had undergone the fatty degeneration in a great portion of its extent. The kidneys inferiorly were strongly injected. The other organs presented nothing abnormal.

*Remarks.*—In this case, according to the report of a medical man, the patient laboured under phthisis, took the ol. jecor. aselli for the space of a year, and was restored to health for the period of twelve months. It becomes a question whether, if the boy



at this period had been removed from the unhealthy lodging in which he lived, and had enjoyed good nourishment, he would not have entirely overcome the tendency to tubercular deposition. Continued exposure, however, to the exciting causes occasioned the return of the disease in an acute form, which terminated fatally in three months. On examination a cavity was found in the left lung, of such an appearance as to render it certain that it could not have been formed during the latter short and acute illness. It must have arisen from a period then antecedent; and we hear a medical man declare that eighteen months previously he had only recovered from phthisis. It is also to be remarked, that no trace of tubercle was to be detected, not only near the cavity, but throughout the whole of the left lung,—a circumstance which, with the appearance of the cavity itself, is conclusive regarding its not being a recent formation. On the other hand, we find the opposite lung studded with fresh tubercles. I therefore conclude that the cavity discovered in a healing state in the left lung belonged to the pthisical condition which existed eighteen months before his death; that the disposition which this morbid change usually possesses of advancing to a fatal termination, was most probably checked by the administration of ol. jecor. aselli, but that a continued exposure to the exciting causes induced a return of

the disease, which attacked the opposite lung, and which terminated in death.

The five cases now detailed may, I think, on the whole, be considered as supporting the opinions of the writers and practitioners formerly alluded to regarding the benefit of this remedy in phthisis pulmonalis. No doubt great caution is necessary, not only in admitting the curability of this disease by any therapeutic means, but also by this remedy in particular. All that is here contended for, however, is simply that enough has been stated to warrant its further trial by the profession. Nothing is further from my intention than exciting exaggerated ideas of the benefits of this substance, either in phthisis pulmonalis or in other forms of scrofulous disease. Nothing is so fatal to the introduction of a new remedy as this; and truth compells me to state that I have seen other cases where the administration of the oil has only produced slight benefit, or none at all. But there does not exist any one remedy which is infallible, and much less is it to be expected that in the disease under discussion, which has universally been allowed to be one of the *opprobria medicinæ*, invariable success can follow the employment of any remedy whatever. From such a rash conclusion a knowledge of the present state of medicine must guard every enlightened practitioner. If, however,



it can be shewn, as I have endeavoured to do, that even a few cases may be snatched from the almost certain fatal termination to which they are at present allowed to proceed, the discussion of this subject will not have been altogether useless.

## Chronic Skin Diseases.

Several cases of chronic affections of the skin in scrofulous constitutions have been completely cured by the oil, when all other remedies have failed. Kopp remarks, that according to his observations its internal use is of very great assistance in these cases, through the power it possesses of improving the fluids. The external use is also very serviceable when hard dry scabs exist. Brefeld indeed says that he has never seen the internal exhibition of the oil beneficial in such cases, and that he relies altogether on its application externally. In this way both he and Guerard have cured very obstinate cases of *tinea favosa*. The latter gives the following case:[1]

A boy ten years old, had for some years laboured under tinea favosa which covered the whole cranium, a portion of the face, the shoulders and upper arms. The scabs were of a horny hardness, two lines ele-

[1] Horn's Archives, Bd. I. s. 522., 1831.

vated above the skin, and exhaled a strong putrid smell. No remedies had been left untried, and at last he employed even all kinds of empiric means of cure, but without success. The powers of the patient at length became exhausted, and all remedies and painful applications were refrained from. Conceiving that the ol. jecor. aselli might possibly be useful, the affected parts were now ordered to be dressed with it, in conjunction with its internal employment. In two months the patient was quite well.

Dr Marshall Hall found its external application beneficial in troublesome affections conjoining the character of impetigo, with erysipelatous redness and swelling, when all other remedies had been tried fruitlessly. He states it also to be a preventive and speedy cure for rhagades or chaps, and of great benefit in cases of eczema, and other diseases inducing excoriation and fissures of the skin. He alludes to the case of a lady "whose hands had been literally crippled for several years, from painful, pustular, fissured, encrusted swelling of the fingers, palms, and back part (impetigo scabida). The case may be conceived from the mere fact of her having applied upwards of two hundred leeches. She experienced great advantage from the first application of the Cod liver oil, and she was speedily cured."[1]

[1] Medical Gazette, 1832. vol. x. p. 796.



Dr G. H. Richter of Wiesbaden, in a paper he has published on this subject,[1] praises the ol. jecor. aselli not only for its beneficial results in scrofulous affections of the skin, but in inveterate cases of itch, and those arising from the abuse of mercury and other causes. In exanthemata, on the other hand occasioned by abdominal affections, especially abdominal plethora, hemmorhoids, liver disease, &c. little or no benefit is to be expected from its use. His treatment is so far peculiar that he gives the brown and impure oil, (he considers the lighter kinds inert) in very large doses, at least from six to ten table-spoonfuls daily. The favourable result, according to him, first appears in the fourth week, and its employment must be continued for three months. At the same time the diet must be strictly regulated, and all flatulent, salted, acid and other substances difficult of digestion, must be avoided. He remarks, that not unfrequently the favourable operation of the oil is first shown by an increase of the eruption, especially of those which in their nature approach psora. From his method of giving the oil he has often observed the secretion of urine increased, which however was only changed in quality in two cases. In these the urine was abundant, and deposited a sediment with specks of fat on its upper surface, such as is often found in the urine of pthisical patients. An in-

[1] Medecin. Zeit. der vereins für Heilk. in Preussen, 1835.

crease in the functions of the skin he has never observed.

The different varieties of chronic eczema, herpes and intertrigo, are especially benefited by the oil. It must not be supposed however that it never fails, or indeed that at any time its results are so striking as in rheumatism, rachitis, or atrophia mesenterica. In two cases where the herpetic eruption had existed for some time, and which have come under my observation, no good result followed, although the remedy had been regularly persevered in for six months. The beneficial operation however was well marked in the following instance for which I am indebted to Dr Nebel of Heidelberg.

### Case XV.

*Herpetic eruption on the left thigh—Failure of various remedies—Ol. jecor. aselli.—Cure.*

John Welsh from Heid, fifteen years of age, and of scrofulous constitution, has for several years laboured under an herpetic eruption on the left thigh, which spread even somewhat over the knee. The whole thigh and a portion of the leg was considerably swollen, so that this, in conjunction with the irregular surface of the skin, gave to the whole somewhat the appearance of elephantiasis. The surface was continually bedewed with moisture, so that his linen, or the dressings applied, stuck to the affected parts, and their removal caused great pain, with a copious discharge of blood from the adhering surface. After employing for eight or nine months a variety of remedies, the ol. jecor. aselli was given internally in table-spoonful doses, twice daily. In four weeks the general swelling and herpetic eruption were somewhat diminished, and the surface was more dry, and in a great measure free from the unpleasantness which formerly attended it. In three months the swelling and eruption had entirely disappeared, and only a furfuracious disquamation on the skin was observable. In another month this also was not to be seen.



In the case of August Rentier, a boy about the same age, who had an herpetic eruption on the face, considerably swollen nose, and deafness, combined with a scrofulous constitution, Dr Nebel also employed the oil internally in conjunction with the baths of Creuznach, and the skin affection has entirely disappeared, while the hearing is much improved.

### Scrofulous Ulcers.

Many ulcers of a scrofulous character, which have resisted all kinds of treatment, have been easily

cured by means of the oil; and not only those which arise from a suppurative process taking place in the external glands, but those occurring over the surface of the body generally. These scrofulous ulcers are generally distinguished by their loose and raised edges, by the soft, spongy, and unhealthy looking base, which readily bleeds from slight irritation, and the yellow cheesy appearance of the matter secreted. The following instance of its success in such cases, was communicated to me by Dr Fürstenberg of Berlin.

### Case XVI.

*Scrofulous ulcer of the arm, of two years' standing—Failure of the usual remedies—Ol. jecor. aselli.—Cure.*

A— C—, the wife of a sailor, 26 years of age, of scrofulous family, and cachectic appearance, applied for assistance, labouring under an ulcer in the upper arm. It was of an oval form, and extended from the acromion, over the anterior surface of the limb, to the insertion of the deltoid muscle. Its base was deep and free from granulation, the edges flaccid, raised, and of a violet colour, which extended into the skin surrounding the ulcer, forming a border an inch and a half in thickness. The general aspect of



the sore had a very indolent character. The secretion from its surface was yellowish, cheesy, and had the peculiar appearance seen in scrofulous ulcers. An examination of the wound showed that the base of the sore was in close approximation with the periosteum covering the bone below. According to the patient's account the ulcer commenced two years ago, and immediately followed an attack of general rheumatic fever, attended with lengthened and violent pains in the whole arm. It was, at first, not larger than half a crown, and accompanied by violent acute pains, particularly at night, which destroyed all sleep, but latterly these have in some degree subsided. She has taken numerous remedies internally, and a variety of applications have been made to the ulcer, but so far from doing good, it has slowly continued to enlarge. On account of the scrofulous habit and cachectic state of the patient, who also in her youth had frequently suffered from chronic scrofulous eruptions on the skin, the ol. jecoris aselli was directly indicated, and ordered to be taken morning and evening in table-spoonful doses. At the same time, the sore was dressed with stimulating washes, which had frequently been done previously without effect. At first the oil appeared to lessen the appetite, an effect which was removed by ordering her to take, in addition, two table-spoonfuls of the elixir aurantiorum, in a little wine, daily,

before dinner. In three weeks the ulcer had undergone a striking improvement. It lost its torpid character; granulations appeared on its base, which, however, were far at first from presenting a healthy appearance; the edges contracted and lost their flaccidity; the secretion became more copious, and the pain so much diminished, that in five weeks the patient could employ her arm with tolerable freedom in her household affairs. In three months, the ulcer, which, at the commencement of the treatment, was between four and five inches long, and three inches broad, had so contracted, that its greatest diameter was only half an inch. This, also, was rapidly diminishing when she left Berlin.

*Remarks.*—The ulcer here was evidently dependent on the general scrofulous and cachectic state of the patient, and was removed when the oil corrected this disposition. I have seen two other cases somewhat similar, in which, although not so extensive, the ulcer soon healed up after the oil had been prescribed. In one of these the sore was situated over the tibia, and was connected with necrosis of old standing.

## Scrofulous Diseases of the Eye.

In several eye affections connected with, or dependent on, a scrofulous constitution, the oil has



been found of great benefit, curing the chronic inflammation and its results. Brefeld found it of great value in the blephiritis glandulosa, where there was great insensibility to light. Carron du Villards, also, has found it produce the best effects in chronic conjunctivitis, and when there existed slight specks on the cornea. Dr Von Ammon, of Dresden, has employed the oil with the best results. He says, "I have given the ol jecor. aselli in two to five table-spoonful doses daily, in obstinate inflammation of the conjunctiva cornea, very near pannus degeneration; whether it originated in scrofulous, rheumatism, psora, or other dyscracia. If there was a tendency to rachitis, the general constitution, as well as the state of the eyes, improved under the use of the oil." It has also been given by Piffard, of Brignoles, with success, in this affection.[1]

[1] Bulletin de Therapeutique, Mai, 1840.

The following is the treatment for strumous ophthalmia, employed in the children's wards of la Charité Hospital, Berlin, by Professor Barez. At an early period, when there is dry inflammation, and photophobia (xeropthalmia of old writers), the cure is commenced by a purgative of rhubarb and calomel. The patient is then ordered one grain of pulv. herb. conii. mac. morning and evening, which dose, if no improvement takes place in eight days, is increased to two grains,—in sixteen days to three grains,—and in very obstinate cases to four grains. This treatment, it is stated, seldom fails. If the patient be brought with the disease in a more advanced stage, and if blennorrhœa be present, the ol. jecoris aselli is ordered to be taken internally, and the following lotion to be applied externally

R.—Hydrar. Submur. . gr. j.
Tr. Opii. . . ℥xx.
Aquæ. . . ℥viij. ℔

Dr Abendheimer, of Heidelberg, informed me that he had given it in numerous cases of scrofulous ophthalmia with the best results, and gave me the following case as illustrative of its effects in this form of scrofulous disease.

## Case XVII.

*Scrofulous ophthalmia of four years' standing—Specks and ulcers of the cornea—Employment of numerous remedies, among others iodine—Cure by means of the ol. jecor. aselli.*

Alexander F——, son of a clergyman, now 15 years of age, has suffered from infancy under various kinds of scrofulous disease. When in his sixth year, he was attacked with ophthalmia, which was accompanied by extraordinary sensibility to light, a copious effusion of tears, and frequent formation of hordeoles in the eye-lids. From the frequent exacerbations of conjunctivitis of the bulb, the cornea became

If there be no blennorhœa, and the child, during the day, can open the eyes, although the lids are swollen with crusts, and adhere to one another in the morning,—instead of the lotion, the following ointment is employed.

R.—Ung. Hydrar. Nit. Oxyd. . ℥ij.
Pulv. Opii. . . . gr. j.

M. Ft. Unguent. A piece the size of a pea to be rubbed on the lid every morning and evening.



cloudy, and several ulcers formed, which degenerated into opaque specks, with facettes. The diet was carefully regulated, and the usual general and local remedies employed, such as saline baths, acorn coffee, guiacum, with rhubarb, conium, mercury, &c., &c., locally bloodletting, and continued derivatives. The room also was kept dark.

These remedies appeared to be of no further use than lessening the occasional exacerbations of the disease. At length iodine was given internally, and also externally, by means of the bath, for a considerable time without effect.

After four years' useless employment of these various remedies, the ol. jecor. aselli was given. At first, two table-spoonfuls were taken daily, which was afterwards increased to four. Nothing was done locally, except guarding the eyes from light by means of a shade. After three months' use of this remedy, there was a striking improvement, and in eight months he was perfectly cured. There was then no appearance of ophthalmia, and no trace of the cloudiness and specks in the cornea remained. He has continued well ever since.

*Remarks.*—The circumstance of iodine having been tried in this case, and failed, renders it interesting, showing that if the action of the oil is to be attributed to that substance, it must at least exist in some form of combination which augments its

virtues. Professor Jüngken of Berlin, gives the oil most extensively in similar cases. He assured me as the result of his most extensive experience, that it was a remedy of the greatest value, and one which he was in the daily habit of prescribing.

Brefeld and Carron du Villards, both used the oil externally, a method which appears well adapted to chronic diseases of the eye, if the general constitution be not deeply affected. In this case, its external application conjoined with its internal administration, appears to facilitate the cure.

The oil when applied to the eyes, occasions considerable smarting, so that in children, its application is often a matter of difficulty. There generally follows, more or less redness of the conjunctiva, and an increased secretion of tears, which, however, soon disappear, and leave an evident improvement in the state of the organ. The brown kind is more irritating than the yellow, but either can be diluted with olive oil if it be found necessary.

I have had the opportunity of seeing the two following cases treated by the external application alone, for which I am indebted to the kindness of my friend, Dr Gruby of Vienna.



## Case XVIII.

*Chronic keratitis, with tendency to the formation of pannus—Loss of sight in one eye—Ol. jecor. aselli applied externally.—Cure.*

A woman, aged 38 years, of lax fibre, but without any well marked signs of scrofula, mother of several children, and who gained her livelihood by needle-work; had perceived during a period of two months that the sight in her left eye had become much weaker. As she did not experience much pain, however, she continued to work, principally by the aid of the right eye. In the third month she saw in her glass that the cornea had become grey, and applied to a medical man, who gave her some medicines and a wash, which produced no benefit. In the fourth month, she consulted Dr Gruby. The cornea of the left eye at this time presented a cloudy greyish colour, but several vessels could be seen ramifying in its substance, which were derived from the external angle of the conjunctiva, and disappeared in a very fine net work. Where these vessels entered, the tissues of the conjunctiva, sclerotica and cornea were a little swollen. The transparency of the cornea was almost entirely lost, and it was only

at its inner edge that some slight traces of the iris could be seen. Its convexity was normal. Sight was completely gone, the possibility of distinguishing light from darkness only remained. She had sometimes slight irritation, not amounting to pain, in the eye itself, but in the supra orbital region there was often dull headache. The meibomian and lachrymal glands did not secrete more than natural. Otherwise her health was good, and the secretions and excretions regular. Two drops of the ol. jecor. aselli were allowed to fall into the eye morning and evening, which caused a strong pricking pain, with an effusion of tears, that continued a few seconds. During the first six days the irritation lasted longer and longer after every application. At the end of this time the cornea was evidently clearer. With the local treatment, was combined an antiphlogistic diet, and the occasional exhibition of purgatives. On the eighth day the oil was suspended for three days, then again applied as before, and after five days again suspended. Only one drop was now poured into the eye morning and evening, which was found sufficient to keep up the reaction for five days, and after this, one drop every two days was sufficient. The treatment was continued in this way two months, and at the end of that time the vessels had entirely disappeared, and the transparency of the cornea had completely returned.



*Remarks.*—In this disease, vessels are to be seen ramifying in the substance of the cornea, and the opacity is to be attributed to the effusions of coagulable lymph. Local stimulation induces an action in the part favourable to absorption—an indication which is well fulfilled by the ol. jecor. aselli.

## Case XIX.

*Xerosis, or atrophy of the conjunctiva and cornea—Total loss of sight in one eye, and partial loss of sight in the other—Ol. jecor. aselli.—Amelioration.*

A married woman, 25 years of age, of phlegmatic constitution, catamenia regular, had in her youth suffered from tinea capitis, and lymphatic swellings of the glands. Since then she has scarcely ever been free from chronic eczema, and has suffered from acute urticaria and occasional diarrhœa. For the last three years she has been occupied from morning to night in sowing gloves, by means of which the eyes were much fatigued. Last winter she took a lodging, which, from some fault in the chimney, was always more or less full of smoke, and it appears that since then she gradually lost sight of the right eye, without her perceiving it. Three

months subsequently the sight in the left eye became dim, and she then applied for relief.

At this time the conjunctiva corneæ of the right eye was whitish and opaque, somewhat similar in colour and appearance to dirty white paper. On examining the cornea with the lens, its surface was seen covered with slight hexagonal convexities, somewhat resembling in appearance the eye of an insect. These cells were pressed together, and of a bluish grey tint, and hence their hexagonal form, and the peculiar colour of the cornea. Its transparency was entirely lost: the convexity normal. A few delicate vessels could be seen with the lens, running in a parallel manner round the margin of the cornea. The posterior chamber and the iris scarcely to be seen. The rest of the bulb was normal. The conjuctiva palpebrarum pale. The lachrymal apparatus intact. The patient often complained of weak pricking pains in the bulb, which induced her to rub them often. The perception of light was almost entirely lost.

On examining the left eye, the middle and upper half of the cornea was found to have undergone exactly the same change as the right. The inferior half, however, was healthy. A few parallel vessels were running on the upper edge of the cornea, as distinguished by the lens. Its convexity was normal, iris moveable. The conjuctiva was slightly



reddened. The secretion of the lachrymal and meibomean glands somewhat increased. She could see large objects, but not small ones, and felt an itching or pricking pain in the organ. There was also dull headach in the left temple.

She had been using some lotion for three or four weeks, which had produced no good result. A drop of the ol. jecor. aselli was ordered to be applied to the right eye every evening. The oil employed was of a brownish red colour, but clear, and had a very sharp taste. Small doses of the tartrate of antimony were administered internally to produce an action on the skin. This, with an antiphlogistic diet, absolute repose, and guarding the eyes from light, constituted the treatment. The application of the oil first caused itching, which continued half an hour, but after the third day only lasted fifteen minutes. On the fourth day the conjunctiva was strongly injected, and there was much epiphora. Several points in the cornea which were formerly opaque became more transparent. She could distinguish large objects. The oil was now suspended, and cold lotions employed. After four days it was again ordered, but did not occasion any reaction. A drop was even applied twice daily, and slight pain with reaction again made its appearance. In a week the cornea looked more grey, having lost much of its dirty white aspect. It was again suspended, and then reapplied. After a

month's treatment she could distinguish the number of fingers held up, and in two months could name the capital letters in a printed page of ordinary sized type. The case was continuing to progress favourably when I left Paris.

*Remarks.*—The nature of this affection is involved in much obscurity. It is supposed, however, to be an atrophy of the conjunctiva corneæ by the German opthalmologists, accompanied by a species of softening of the tissue. Atrophy is manifested by the small concavities observable with a lens, the edges of which are pressed together in such a manner as to give them a regular form. The softening appears to occasion the dirty whitish tint, which causes the opacity and peculiar colour observed in this disease. It has hitherto been considered incurable, and in the present case the oil was employed without much hope of benefit, and because experience has sufficiently proved other applications to be useless. The good results, however, which attended its employment in this case warrant a repetition of its application under similar circumstances.

A remedy which has been given with such good results in some diseases, has, like all new medicines, been tried in numerous others, and occasionally with success. Thus, it is said to be useful in the small, hard, chronic swellings of the female breast,



after topical bloodletting, and Katzenberger found it beneficial in dislodging ascarides when given in the form of clyster. Münzenthaler cured with it a case of periodic cardialgia,[1] and another of hemicrania.[2] It has also been employed in some nervous diseases. Osberghaus states that he has administered it with a good result in spasmodic affections of the chest, and of the stomach, and the same writer informs us that he has seen two cases of epilepsy cured by it. Kopp cured a youth of 17 years of age, affected with chorea on one side of his body, and another suffering under nervous tremor, by its means. Spitta states that its good effects were well marked in a patient labouring under enuresis and paralysis of the inferior extremities. Schupmann has recorded two cases of paralysis in the inferior extremities cured by the oil,[3] and Puchelt has published an account of two cases of paralysis, arising from onanism, which recovered under its use in the clinical hospital of Heidelberg.[4]

That the ol. jecor. aselli possesses any real beneficial operation in pure nervous disorders is more than doubtful. But that individuals affected with such complaints, and in a cachectic state from the

[1] Hufeland's Journal. Bd. 78. s. 52. [2] Ibid. s. 75.
[3] Ibid. Bd. 70. Heft. 4. s. 115.
[4] Heidelberg Med. Annal. Bd. 6. Heft. 3.

development of scrofula are capable of being benefited by the oil is certain. Such cures, therefore, of epilepsy, paralysis, &c., are to be attributed to the removal of the scrofulous complaint and general cachexia with which they are often connected.

According to M. Rayé of Vilvorde,[1] the Cod liver oil is of great advantage in the treatment of chronic affections of the lungs. He states that he has given it to more than 120 persons affected with chronic pneumonia and chronic gastritis, and obtained the best result in at least two-fifths of the cases, although in most of these, medicine had previously been rationally employed in vain. Dr Rutten of Verviers described to Delcour the case of an individual who, as the result of a chronic pleuro-pneumonia, was reduced to the last degree of marasmus.[2] The case appeared desperate when the Cod liver oil was given. The individual had continued fever, an intense cough, with purulent expectoration, nocturnal sweats, œdema of the extremities, evident atrophy, &c. &c. From the moment the oil was employed a notable change took place, and the individual was completely cured. It is probable that in these, as well as in many other cases where wasting of the general strength and loss of muscular substance has taken place, that

[1] Journal de Conn. Med. Chir. Tom. 3me p. 429.
[2] Archives de la Médicine Belge. Tom. 1, p. 270.



the analeptic properties of the oil would prove of great benefit.[1]

Lastly, Professor Dieffenbach of Berlin has given it to numerous individuals labouring under carcinoma in all its forms with extraordinary good results. This fact has even found its way into several journals. It is not to be supposed, however, that this celebrated surgeon has ever by its means cured cancer when already formed, or even ever eradicated it from the constitution. On the contrary, as he himself explained to me, what he means by good results is having, in numerous cases, when the individuals had been much exhausted, and presented a highly cachectic and unhealthy aspect, seen these latter symptoms removed, the appetite and digestion return, so as to approach a normal state, and life again rendered tolerable for a few years.

[1] When at Frankfort on the Maine, last spring, Dr Spiess of that town communicated to me the case of Miss Harriet R——, an English girl, aged 13, of scrofulous disposition, who was seized during January 1840, at Coblenz, with a violent cough, attended with great expectoration, and febrile symptoms, which induced a suspicion of phthisis. After many remedies had been tried unsuccessfully, the ol. jecor. aselli was given, and the cough, and expectoration from that time gradually diminished. She remained well all the summer, but the winter following, when at Frankfort, the same cough returned, and became very violent, but disappeared again in a few weeks on taking the oil. The mother of the patient expressed much surprise at never having heard of this remedy in England.

## Circumstances necessary to be attended to in the administration of the Cod liver oil.

From all which has preceded it appears necessary that certain circumstances should be attended to before any uniform benefit can be expected to result from the employment of the ol. jecoris aselli. The following points are those which demand most attention.

1. *The Diagnosis*, which must be correct, not only as regards the disease, but as regards its form.

2. *The Constitution.*—The flaccid and phlegmatic bear it best, and the plethoric worst. In scrofula with torpidity it is directly indicated. If irritation be present, however, its employment requires management and great care.

3. *The Contra-indications.*—These are plethora, a disposition to inflammation, profuse menstrual or hemorrhoidal discharges, total loss of appetite, nausea and vomiting, pain in the abdomen, and diarrhœa dependent on disease in the intestinal walls.

4. *The time of Administration.*—It should not be given in the morning fasting, and its employment is not advisable during epidemics of dysentery or diarrhœa.



5. *The Quality of the Oil.*—The best is the clear brown or reddish variety, next in power is the yellow, and the least beneficial is the white. A sample of the oil employed should always be analysed, in order to determine whether it contain iodine as a constituent.

6. *The Dose.*—In adults it should be gradually increased to a strong dose, such as six table-spoonfuls; in children a smaller dose proportionate to the age.

7. *The Diet.*—A fat animal diet supports the action of the oil. All substances abounding in starch are to be avoided.

8. *The Conjoined Treatment.*—Sometimes it is necessary to give aromatics and bitter tonics, and in numerous instances, especial medicines are required, according to the nature of the case. Not unfrequently a course of chalybeate waters has been found useful.

9. *The Duration of the Treatment.*—In every case it is necessary to give it a sufficient length of time. The chronic diseases in which it is beneficial can only yield slowly. In this respect the practitioner must be guided by its effects on the constitution.

10. *The judicious Suspension of its Use.*—1st, Should it occasion derangement of the digestive organs, diarrhœa, increased flow of the menses, &c.; and, 2dly, After its employment has been continued five or six months. In this last case it should be suspended

two or three weeks, and bitter or ferruginous tonics given, according to circumstances, to support the tone of the stomach.

# APPENDIX.

For the following two cases, I am indebted to Professor Rineker of Wurzburgh, by whom they were communicated to me during a recent visit he made to this country.

## Case XX.

*Chronic gout of ten years' standing—Great contraction of the extremities—Calcareous concretions in the finger joints—Various remedies employed without effect—Ol. jecoris aselli.—Cure.*

Adam Frederich, shoemaker, 60 years old, had suffered from gout more than ten years, both in the upper and lower extremities, and when he came under the care of Professor Rineker all the limbs were considerably contracted. This contraction was much greater on the left side than on the right, so much so indeed, that during progression the trunk was much thrown towards that side, and appeared latterly to be permanently distorted. The finger joints in both hands were loaded and much swollen from the deposition of calcareous concretions. He also suffered from attacks of very acute pain in the left extremities, which returned at intervals of three or four weeks, and were of several days' duration.

The patient during his long illness had employed numerous remedies without experiencing any permanent relief. He had taken colchicum repeatedly, for a long time, guiacum both in substance and decoction, turpentine, baths simple and medicated, &c. He was now ordered

to take a table-spoonful of the ol. jecor. aselli twice a-day, which dose was soon increased to three table-spoonfuls twice daily. At first, he expressed strong disgust for the remedy, and felt considerable nausea, but never vomited. In a week these unpleasant symptoms disappeared, and he took it readily for six months without intermission. It was two months before any improvement could be observed; at the expiration of that time, however, the acute attacks became less violent, and these in four months entirely disappeared. At the same time, the muscular rigidity and contractions in the extremities gradually diminished, so that this individual, who for years, had been unable to stand upright, or walk without difficulty, at the expiration of six months could remain perfectly erect, and use all his limbs with the greatest freedom. The concretions in, and swelling of the fingers, however, remained unaltered.

## Case XXI.

*Spondyloarthrocace—Paralysis of the inferior extremities—Acute curvature of the dorsal vertebræ—General symptoms of cachexia—Atrophy of the inferior extremities—Failure of moxa and other remedies—Ol. jecoris aselli.—Cure.*

N. Scharfenberg, a boy at present six years old, of scrofulous family and habit, enjoyed good health, until he entered upon his third year, and at that time could walk perfectly. Then, however, the mother observed that the boy was readily fatigued, and at last could only support himself with great difficulty. A medical man who was consulted, detected a hard swelling in the dorsal region, dependent apparently on distortion of the vertebræ. Notwithstanding the application of local blood-letting, moxa, and other derivatives, followed by the use of baths and the internal administration of ferruginous tonics, pulv. antimonialis, and other alteratives, the disease continued to progress, so that at the expiration of a year from the time he became unwell, he laboured under perfect paralysis of motion in the inferior extremities, while the sensibility was greatly diminished. At the same time the



swelling in the back gradually increased, and the upper part of the trunk was thrown forward. In this state the child remained completely helpless for the space of another twelvemonth, his parents considering the case incurable, and although treating him with care, and employing such popular remedies as suggested themselves to them, otherwise abandoning him to his fate. At this time Professor Rineker, when visiting another patient in the same house, was induced to examine him, and discovered an angular prominence of the fifth, sixth, and seventh dorsal vertebræ. The angle was so acute, that it was evident that the bodies of the vertebræ were greatly softened, and that the disease was in its third stage. At the same time all the constitutional symptoms of scrofula were strongly marked. His whole appearance was highly cachectic, the skin of a dirty white colour, the abdomen considerably swollen and tense, the inferior extremities much atrophied, diarrhœa alternating with constipation, &c. There was, however, no hectic fever, or colliquative sweating. The respiration was in some degree difficult, but a careful examination of the chest proved that the lungs were healthy. A table-spoonful of the ol. jecor. aselli was ordered to be taken morning and evening, which dose was increased, as in the last case, to six table-spoonfuls daily. In fourteen days an improvement was already manifested in the general health. Digestion appeared to be performed with greater facility, the excretions from the bowels became more regular, and a considerable transpiration took place from the skin. In six weeks the boy could move his lower extremities, and even stand when somewhat supported. The symptoms previously described gradually disappeared, so that in six months he could walk alone without difficulty, while the trunk had nearly regained its natural upright position. After taking the oil for eight months a perfect cure might be said to be established. The boy could run with facility, stand perfectly erect, his appearance was blooming and healthy, and the prominence in the back had greatly diminished. Indeed, without having the attention especially directed towards it, the deformity might entirely escape observation.

In this case not only was there no disgust for the remedy, but the boy appeared to like it from the commence-

ment, invariably asked for it when not administered at the usual time, and evidently regarded it as a delicacy. Notwithstanding also the large doses, which were continued so long, no disorder whatever took place in the digestive functions.

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In Pereira's Materia Medica, I find the following quotation from Pennant, who describes a method by which the oil is prepared in Newfoundland:—"They take a half tub, and, boring a hole through the bottom, press hard down into a layer of spruce boughs, upon which they place the livers, and expose the whole apparatus to as sunny a place as possible. As the livers corrupt, the oil runs from them, and, straining itself clear through the spruce boughs, is caught in a vessel set under the hole in the tub's bottom."[1]

A reference also is made to an analysis of the oil by Herberger,[2] who, it is stated, has found in 1000 parts of the brown oil, 2.586 parts of iodine of copper, and 0.441 parts of bromide of potassium. I have, however, not been able to procure the original memoir of this chemist.

[1] Artic Zoology, Vol. I. p. 193.
[2] Pharm. Cent. Blatt. 1839, s. 855.

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W^r James Fleming
with the Author's regards

# PATHOLOGICAL AND HISTOLOGICAL RESEARCHES

ON

# INFLAMMATION OF THE NERVOUS CENTRES.

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(*From the Edin. Med. and Surg. Journal*, No. 153.)

(*From the Edin. Med. and Surg. Journal, No.* 157.)

THE two following observations are valuable in many points of view, and tend to confirm the results previously arrived at.

OBS. XXXII.—*Fever ; Cephalalgia ; Delirium ; Fungoid tumour at the base of the orbit ; death in thirty-six days ; abscess in the left anterior lobe, surrounded by fawn-coloured softening, containing numerous exudation corpuscles ; yellow softening of the central substance of left hemisphere containing neither purulent matter or exudation corpuscles.*

John Vallence, aged 24, an iron-founder, admitted into the Royal Infirmary, under Dr Craigie, March 2d 1843. Eight days previously he had been seized, after exposure to cold, with pain, swelling, redness of the left eye, and pain in the forehead. On admission the eye-ball was swollen, red and tense. There was great sensibility to light, with chemosis, and increased discharge from the left nostril. The vascularity of the right eye was also increased. The tongue was loaded, and there existed a typhoid eruption on the skin over the back and chest. Pulse 100, full and hard. (*Venesect. ad* ℥xij. *Saline Mist.*) The bleeding produced considerable relief ; pulse fell to 92. March 4th, The bleeding was repeated to ℥xvj. and again caused diminution of the pain in the eye and forehead. There is a profuse discharge from the eye and left nostril. A tumefaction with obscure fluctuation is perceptible in the forehead, above the left eyebrow. He has passed a restless night with muttering and delirium. March 6th, The swelling in the forehead was opened yesterday, and a small quantity of matter evacuated. Complains much of debility. March 7th, There is a purulent discharge from the incision and from the left nostril. The delirium and constitutional symptoms are abated. The eye now became daily more and more protruded from the socket. The eyelids continuing very tense and swollen. They were occasionally punctured with relief. He always complained of more or less pain in the forehead, and the discharge continued up to the time of his death. On the 30th of March, after drinking largely of tea, he complained of cold shivering, which was soon after followed by coma and stertorous breathing, and he died in about twenty minutes, at half-past five P. M.

*Sectio, April* 1*st* 1843.—On removing the skull-cap, the hemispheres anteriorly were found somewhat flattened, and the convolutions pressed together. An abscess the size of a hen's egg existed in the

left anterior lobe of the brain, anterior to the *corpus striatum*, lined by a yellow membrane. This abscess communicated with the base of the cranium, and extended somewhat into the right anterior lobe, both lobes being adherent. Superiorly it was connected with a fungoid tumour involving the bone at the inner side of the orbit; internally encroaching on the nasal cavities, and externally pushing out the eyeball and stretching the optic nerve. The cerebral substance surrounding the abscess was softened and of a fawn colour. The central medullary substance, on the left side, was much diminished in consistence, and even pulpy towards the centre of the hemisphere. It was of a light straw-colour, in every way resembling purulent infiltration.

The other organs were not allowed to be examined.

*Microscopic Examination.*—The abscess was composed of normal purulent matter. The fawn-coloured softening surrounding it contained numerous exudation corpuscles and granules. The straw-coloured softening, in the central medullary substance of the hemisphere, was wholly composed of the medullary and varicose tubes, very much broken down, without any trace of purulent matter or exudation corpuscles.

*Remarks.*—In this case intense cephalalgia and delirium were the leading cerebral symptoms. After death an abscess surrounded by an inflammatory softening existed in the left anterior lobe, to which these symptoms may be ascribed. The medullary substance of the hemisphere, however, was also softened and of a light straw-colour, exactly resembling to the naked eye, a purulent infiltration. Dr Craigie pronounced it to be the yellow inflammatory softening described by all pathologists, which it undoubtedly was. Yet, on examination, it contained no purulent matter or exudation corpuscles, or presented any traces of inflammation, and when compared with the softening surrounding the abscess, it became evident, was of a nature totally different.* Now if we regard the symptoms, and mark the absence of paralysis, contraction, and the other signs, which, in numerous instances, we have seen to characterize inflammatory softening of the central medullary substance, we cannot, for a moment, suppose that this lesion was the result of inflammation.

I attach great value to this case. 1st, Because the lesion, to the naked eye, was so characteristic of yellow softening, exactly corresponding with the descriptions of Rostan, Lallemand, and others. 2*d*, Because a pathologist, in every way so candid and deserving of confidence as Dr Craigie, pronounced it to be inflammatory, which it would certainly have been considered by every pathologist without an appeal to the microscope. 3*d*, Because, on comparing it with a really inflammatory softening existing in another portion of the brain, the histological differences we have previously pointed out became evident, as was acknowledged by all present.

* Drs Craigie, Watson, and Peacock were present, and acknowledged the truth of this, on seeing the demonstrations under the microscope.



Obs. XXXIII.*—*Hemiplegia of the right side; loss of consciousness; convulsions of the superior extremities; death in thirteen hours; capillary hemorrhage into both corpora striata, but to the greatest extent on the left side; central medullary softening; absence of exudation corpuscles and granules.*

Sarah Ford, aged 21, a milliner, was seized at about 8 o'clock A. M. on the morning of August 2, 1843, when getting out of bed, with paralysis of the right arm and leg. She was immediately put to bed, when she exclaimed "Oh dear," lost all consciousness, and was attacked with convulsions of the superior extremities. When seen at two P. M., she was still unconscious, and the superior extremities were convulsed. There was also grinding of the teeth, and foaming at the mouth. The pupils were dilated, but contracted on the application of light. The impulse of the heart was felt all over the chest. Action of the arteries very violent; pulse 120; bowels confined. (Venesectio; leeches to the temples; blister to the nape of neck; enemata.) The convulsions ceased after the bleeding. She continued, however, insensible, and died at 9 P. M.

The patient had been out walking on the day previous to the attack with some friends, and was considered by them to be more cheerful than usual. She menstruated regularly every fourth week. She had, however, occasionally complained of headach, and caused her mother to notice, a week previous to the seizure, a more than usual pulsation in the carotids.

*Sectio, 36 hours after death.*—On removing the *dura mater* the convolutions of the surface of the hemispheres were found much flattened, and the arachnoid was somewhat dry. The vessels of the *pia mater* displayed an unusual turgescence. The ventricles contained about ℥iij. of bloody serum. The *plexus choroides* on both sides enlarged from an extravasation of blood into its texture. The *corpora striata* were infiltrated throughout their substance with numerous and very minute dark-coloured extravasations of blood,—that of the left side was rendered completely pultaceous and broken up, resembling lees of wine. The extravasation appeared to be confined to the gray matter, the adjacent medullary substance presenting its normal colour and vascularity, although its consistence was somewhat diminished. Lungs healthy. Heart flaccid, and its lining membrane dyed, probably from exudation, the body being much decomposed. Abdominal organs healthy.

*Microscopic Examination.*—The nervous tubes were readily separated from each other, but neither in the medullary or gray matter were any exudation corpuscles or granules apparent.

*Remarks.*—This case is very similar to Obs. XV. Sudden apoplexy, preceded by cephalalgia, convulsions, but no contraction,

* For the particulars of this case I am indebted to the kindness of Dr M'Cormac, Physician to the Canongate Dispensary.

and death in a short period. The medullary substance, though softened, in neither case presented exudation corpuscles or granules; and it is worthy of remark that here also there were none of the symptoms of inflammatory softening. These results are very important, as it has lately been stated by M. Durand-Fardel, that softening connected with sanguineous infiltration, is a proof of inflammation. The consideration of this question, however, will be found in a subsequent part of the paper.

In consulting works with a view of determining how far the labours of others might serve to assist in this inquiry, I can only discover twelve observations of inflammation of the brain recorded, where the diseased structures have been examined microscopically. These, unfortunately, are very imperfect, and can only be partially taken into consideration. I shall avail myself of them, however, as far as the facts recorded will allow. In order to afford others also in this field of inquiry all the information that exists on the subject, I shall now combine these observations with my own, numbering them consecutively to facilitate subsequent references.

Eleven observations have been published by Dr Gluge in the Oestreichische Medicinishe Wochenplatt. Unfortunately, I have not been able to procure the original memoir, and am indebted to the Provincial Medical Journal, for November 1842, for the following account.

Obs. XXXIV.—*Female; paralysis; pultaceous softening of several points of the cerebrum and cerebellum, both in the gray and white substances.*

*Microscopic Appearances.*—The nervous canals were broken up into fragments, but not changed in appearance; these fragments were mixed up with spherical, opaque corpuscles, ten times larger than purulent matter globules, and enveloped by numerous small globules, which were easily separated by slight pressure; the latter were spherical and transparent. When the scalpel was dipped into the softened mass, the drops which fell from it contained a great number of the above-mentioned corpuscles mixed with fragments of nerve tubes. The healthy portions of the brain did not contain a trace of them.

Obs. XXXV.—*Male; cerebral symptoms without paralysis; softening to the extent of a few inches of the anterior lobe of the cerebrum.*

The softened mass contained a few fragments of nerve tubes with a great number of the globules already mentioned, agglomerated together.

Obs. XXXVI.—*Female; apoplexy; paralysis of left side; recent attack within fourteen days; extensive softening of the right hemisphere, which was of a mixed red and gray colour; left hemi-*



*sphere injected, but of a natural consistency; apoplectic clots in both, and a reddish-coloured fluid in both ventricles.*

The latter contained agglomerated globules, and fragments of nerve tubes; and the coagulated blood enclosed similar fragments. An enormous number of agglomerated globules were found in the substance of the right hemisphere, and but very few on the left side. Nerve tubes could not be discovered in the coagula.

Obs. XXXVII.—*Male; paralysis of the left side for several months; red softening of the right hemisphere; great congestion of the capillary membrane.*

The nervous tubes are shrunken, or not easily discovered, and only small fragments of them can be found in the softened portions of the brain; in the remainder they are unchanged. The agglomerated globules exist in great quantity in the white and gray softened parts.

Obs. XXXVIII.—*Female; sudden attack four weeks before death; paralysis of right side, and contraction of limbs; effusion of blood into, and softening of right ventricle.*

The softened mass contained nothing but fragments of nerve tubes, mixed with a great number of agglomerated globules in the white and gray substance, the capillary net-work round the softened parts were deeply injected.

Obs. XXXIX.—*Male; constant delirium; excessive sensitiveness of the skin; contraction of right arm; no paralysis; deep-red softening of right hemisphere; some straw-coloured fluid in left ventricle; upper surface of corpus striatum softened; white softening of pons and corpus callosum; gray red softening in the cerebellum.*

The fluid of the ventricles contained some blood corpuscles and agglomerated globules. In the portions of nervous substance affected with white softening were some fragments of nerve tubes, which were scarcely recognizable, and some globules, an immense quantity of which existed in the red softened parts. In the middle of the cerebellum was a softened gelatinous spot, about the size of a halfpenny; here the nervous tubes were easily distinguished with several agglomerated globules and numerous pus globules, from the admixture of which arose the gelatinous appearance.

Obs. XL.—*Female, 40 years; had an apoplectic attack six weeks previously; paralysis of left side. The posterior portion of the right hemisphere exhibited every gradation of red softening up to yellow points, but the softened parts were not diffluent; in a small portion there was white softening, without any change of colour whatever.*

In this part the nerve canals were collected into bundles and shortened, and a white amorphous substance was interposed between the fragments of the tubes; no trace of agglomerated globules, which, on the contrary, were numerous in the points of red softening. Here the tubes had either disappeared or were reduced to mere striæ; the yellow points looked under the microscope like masses of fat globules.

Obs. XLI.—*The patient had complained for a long time of headach, stupor, and creeping sensations in the limbs; cavities in the hemisphere, and pons lined with a species of reddish membrane.*

The surrounding nervous substance was softened, and here was a large quantity of agglomerated globules.

Obs. XLII.—*Fall from a height; fracture of skull; death; effusion of blood at the base of the cerebellum in both ventricles, and in various parts of brain; pultaceous softening of several points, with fragments of nerve tubes, but no trace of agglomerated globules; fragments of the tubes and of the cellular net-work in the coagula.*

This case furnishes an example of mechanical softening from effusion of blood.

Obs. XLIII.—*Apoplectic softening without any product of inflammation.*

Numerous fragments of lacerated cellular net-work, and unaltered nerve tubes in the apoplectic cell, and no trace of globules in the softened mass around it.

Obs. XLIV.—*Girl, 16 years old; apoplectic clot in the pons; death on the day of attack; the patient had merely complained of headach. Throughout the medullary substance the net-work of fine cellular tissue strongly injected; in the coagula lacerated nerve tubes.* Ostr. Med. Woch. Jan. 22 1842. Prov. Med. Journ., No. 113, November 26th 1842.

*Remarks.*—The foregoing observations appear to be mere notes made from time to time so as to assist the memory, rather than to give such information as was desired. Neither the age of the patient, or the symptoms, the *post mortem* or microscopic appearances are given with sufficient exactitude to enable us to draw from them any very satisfactory conclusions. Yet it is evident that Gluge saw exudation corpuscles in many cases of inflammatory softening, (Obs. XXXIII. to XL.) and that in other instances where the brain was also softened, he found none. (Obs. XLI. to XLIII.) Obs. XXXVIII. is interesting in many points of view, although the looseness of detail leaves much to be desired. For instance, neither the duration of the disease nor the extent of the red softening is mentioned. But the difference in structure between this red softening of the hemisphere and the white softening of the central portions is noticed. The gelatinous spot containing pus globules in the centre of the cerebellum was probably an abscess. In Obs. XXXIX. also, the different structure between the inflammatory and non-inflammatory softening is noticed; but the nerve canals being collected into bundles and shortened, &c., probably arose from something unusual in the demonstration. I have frequently seen such appearances, but on endeavouring to reproduce them, have failed.



Hence, I have always attributed them to some peculiarity of size or shape in the portion of brain examined, or to the mode of squeezing it between the glasses. In Obs. XL. it is shown that inflammatory softening sometimes surrounds old apoplectic cysts, as has previously been noticed, (Obs. XI. XII. XIII. and XXIV.) In the three last cases he has pointed out that softening produced by mechanical injury and by apoplexy proving suddenly fatal, contains no exudation corpuscles, confirming the results previously given, (Obs. XIV. XV. and XXI.)

Since the above was written I have seen in the work of M. Durand-Fardel,* another analysis of Gluge's memoir, which appears to have been originally published in the *Archives de la Médécine Belge, Janvier et Fevrier* 1840, and copied into *l'Experience, 30th Avril* 1840. Neither of these journals has it been possible for me to procure in Edinburgh. It would seem, however, from the account of M. Durand-Fardel, that the eleven observations now given are the same which constitute the basis of his original memoir, although he states that in his 10th case (Obs. XLII.) globules of purulent matter were present in the softening; a circumstance which appears to me very improbable, and is quite opposed to all the observations I have hitherto made. The following, also, are given as the conclusions arrived at by M. Gluge. "1*st*, White softening contains purulent matter in a great number of cases; 2*d*, The coloured softening, without extravasation of blood, presents the products of one of the first degrees of inflammation, formation of compound globules; 3*d*, The coloured softening with extravasation of blood may present the preceding products, or only the mechanical imbibition of sanguinolent serum. This is ordinarily the case in recent apoplexies." I shall refer more particularly to the error of the first conclusion, when alluding to the colour of softenings.

The only other observation with which I am acquainted, is recorded by Vogt,† in his work on Softening of the Brain and Spinal Marrow. It is as follows:

Obs. XLIV.—"Not long ago there died in the Clinical Hospital a child with all the symptoms of acute hydrocephalus. At first there were frequent attacks of convulsive trembling of the limbs, incurvation of the thumbs, contractions in the fingers with tetanic rigidity of the inferior extremities, and in the muscles of the back. The speech was entirely lost, and, notwithstanding soporose attacks, especially in the night, during which the inferior segment of the cornea of both eyes became dry, and latterly quite turbid, yet the

* Traité du Ramollissement du Cerveau, par Max. Durand-Fardel. Paris, 1843.
† Ueber die Erweichung des Gehirns und des Rückenmarks, von. Dr. Ph. Fr. Wilh. Vogt, pp. 81 and 82.

organs of sense were in such a state as to enable the child to hear to make movements with its trembling hands according as objects were presented to it, to distinguish drinks, &c. A short time before death the senses became extinguished, and symptoms of pressure on the brain became manifest. The convulsive and tetanic symptoms were always more severe on the right side. At the autopsy, independent of congestion, we found no change in the membranes of the brain, neither effusion in the ventricles, neither were these or the fornix softened. On the other hand, the whole brain was more moist and swollen, and became prominent (springing forward *hervor quellend*) on removing the skull-cap. Both *corpora striata* were softened. In the left *corpus striatum*, a spot the size of a bean was quite diffluent, and the parts surrounding it were softened to an inferior degree. On the right side the softening had only reached this lesser degree. All present at the section agreed that the pathological changes might readily have been overlooked, had not the examination been made with great care. Here was also seen under the microscope all the phenomena of Valentin's so-called second stage of softening, with the well-known corpuscles."

*Remarks.*—We here find inflammatory softening of both *corpora striata* causing tetanic convulsions and latterly resolution in the limbs. The phenomena were more marked on the right side, and the lesion was further advanced in the left *corpus striatum* than in the opposite one. The age of the patient is not given. It is worthy of remark, however, that in this instance only, the *corpora striata* were affected, whilst the central white portion of the brain was healthy. On the other hand, in a somewhat similar case previously recorded, (Obs. IX.) the gray masses were healthy, whilst the lesion was confined to the white matter. Why it should have struck all present, that a softening in the *corpus striatum*, containing in its centre a diffluent portion the size of a bean, would have escaped observation without extreme care, is to me inexplicable. If this be correct, it merely argues that the *post mortem* examinations in the clinical hospital at Bern must be conducted in a very loose manner.

Vogt tells us that the corpuscles described by Valentin as characterizing the second stage of softening were present. In other parts of his work also he alludes to observations made by Valentin. But in no place does he refer to where such observations have been published, nor does he even state that they have ever been placed on record. Here it must be remembered that they are both professors in the same university. Still, from his allusion to the opinions of Valentin, I ascribed to that anatomist the merit of having observed and described these bodies in inflammatory softening f the brain, (Journ. No. 153, p. 395), although I am only acquainted with his opinions through the statements of Vogt.



## On the Nature of Softenings of the Nervous Centres.

The nature of softenings has been much disputed. Some attribute them entirely to chronic or acute inflammation, others, while they acknowledge that some softenings are undoubtedly thus produced, are also of opinion that they may occasionally depend upon other causes. Thus softening has been considered a lesion *sui generis* similar to what occurs in ataxic fever, (Recamier); to *gangrena senilis*, (Rostan, Abercrombie); to obliteration of the arteries, (Bright, Carswell); or to a diminution of nutrition, (Delaberge, Monneret.) It has also been referred to *post mortem* maceration, (Carswell, Paterson of Leith), and is undoubtedly often produced by mechanical violence after death. The difficulty hitherto has been how to distinguish with precision one kind of softening from another.

The observations detailed have shown that two varieties of softening undoubtedly occur. In the one the products of inflammatory exudation may be detected, in the other these are not present. It is necessary to determine with exactitude the distinguishing characters of these two kinds of softening, which may be denominated inflammatory and non-inflammatory softenings.

1. *Character of inflammatory softening.*—On placing a minute portion of the inflamed nervous structure between two slips of glass, then pressing them, so as to render it visible by transmitted light, and examining it with a magnifying power of 300 linear diameters, the following appearances will be observed. Besides the normal, tubular, and granular structure of the parts examined, there will be found, 1*st*, exudation granules coating the vessels, or floating loose, either isolated, or in the form of masses; 2*dly*, exudation corpuscles, with distinct cell walls, sometimes nucleated as formerly described. The more pultaceous and diffluent the softening is, the more numerous are the granules and corpuscles. The nervous tubes and normal structures also then become more and more broken down.

*The nature* of inflammatory softening will become evident from what has formerly been stated. (Journ. No. 135.) It results from the active growth, development, and breaking down of nucleated cells, (exudation corpuscles,) in the effused blood plasma. It is not a mere maceration of the textures in serum. No doubt the serum performs an essential part in the process, inasmuch as moisture is necessary for every species of growth. But we are of opinion that softening cannot be considered as dependent on inflammation without the existence of these bodies. So far from being connected, as some have supposed, with diminished nutrition, it is, in point of fact, an increased nutrition in the excess of blood plasma effused. It would be out of place to enter upon the consideration of the facts which have led us to this conclusion. They

could only be appreciated by alluding to all the phenomena of inflammation, and discussing what we are really to understand by that term. I hope shortly to be enabled to lay my views on this subject in detail before the public.*

2. *Character of non-inflammatory Softening.*—Following the same mode of demonstration as that just described, we find that the cylindrical and varicose tubes of the part are rendered more soft and easily separable from each other. They have more or less lost their natural firmness and consistence; are readily torn across; the varicosities are easily enlarged by pressure, and, when separated or broken off, assume a globular form. The tubes also are more or less broken down into fragments. No exudation granules, masses, or corpuscles are to be detected.

*The nature* of non-inflammatory softening varies according to circumstances. It would seem to arise from four causes; 1*st*, From mechanical violence in exposing the nervous centres, (Obs. XVI., XXII., XXVI.) 2*d*, From a mechanical breaking up of the nervous tissue, by hemorrhagic extravasations, whether in mass, (Obs. V., XIV., XXIII.) or when infiltrated in small isolated points, constituting capillary apoplexy. (Obs. XV., XXXIII.) 3*d*, From the mere imbibition of effused serum, which loosens the connection between the nervous tubes, and diminishes the consistence of the nervous tissue. (Obs. XIX., XX., XXXII.) 4*th* From the process of putrefaction.

Dr Paterson of Leith, in a paper on Pseudo-morbid softenings,† after alluding to the frequency of these without any symptoms indicating their presence, has shown by a series of experiments that the brain rapidly imbibes fluid, and becomes, in consequence, unusually soft. The facts he has communicated with reference to this subject are very valuable. But the manner in which he endeavours to separate the inflammatory from the non-inflammatory softening is most unsatisfactory, and might be shown from the result of our researches to be erroneous. For instance, he observes "softenings may be considered then the result of inflammatory action, when they are surrounded by a zone of red vessels with small coagula, or if the softened portions are infiltrated with purulent matter." Now the zone of red vessels is very rarely seen in inflammatory softenings, and the infiltration with purulent matter, to which, following Lallemand, Dr Paterson alludes, has no real existence so far as my observations have hitherto gone. On the other hand, the circumstances he mentions as characteristic of pseudo-morbid softening, we have seen to occur in Obs. VIII and IX. although the lesion was undoubtedly inflammatory. It is only

* An abstract of these will be found in the Lond. and Edinb. Med. Journ., December 1842, and Microscopic Journal, Vol. ii.

† Ed. Med. and Surg. Journ., Vol. lvii. p. 110.



the microscope, then, that can enable us to distinguish with certainty one from the other.

As regards the difference supposed by some to exist between the softening in adults and that in old persons, I fully agree with M. Durand-Fardel, when he observes, "that cerebral ramollissement is the same malady in old persons as in adults; that it presents no other differences than the modifications which a great difference in age always produces, connected only with the form and not with the nature of the lesion." (Op. cit. p. 166.)

The previous observations offer no argument or proof in favour of the opinions which attribute softening to a lesion *sui generis*, to diminution of nutrition, to gangrene, obstruction of arteries, &c. all which explanations appear to us hypothetical in the highest degree.

The details entered into in the different observations not only demonstrate the existence of inflammatory and non-inflammatory softening histologically, but indicate that the symptoms which accompany them are widely different. Thus in the twenty four observations hitherto recorded, in which cerebral softening was observed, exudation corpuscles were present in eighteen, whilst in six no trace of these bodies could be found. Again, in the eighteen cases of inflammatory softening, there are four in which there also existed in another part of the brain non-inflammatory softening. On analyzing the symptoms of these cases, we shall find a marked difference between those accompanying the one lesion or the other. Thus in the fourteen cases where only inflammatory softening was present, well-marked symptoms invariably existed, such as loss of consciousness, preceded or followed by dulness of intellect, contraction and rigidity of the extremities, or paralysis.

Very different were the symptoms in the six cases where the lesion presented the characters of non-inflammatory softening. In three of these there was a large extravasation into one side of the brain, followed by sudden coma and hemiplegia, (Obs. XIII. XIV. XXIII.) In the fourth and fifth cases there was sudden loss of consciousness, with convulsions, but no paralysis or contraction, and on dissection capillary apoplexy with central softening was found, (Obs. XV. XXXIII.) In the sixth case there was also extensive softening without any effusion of blood whatever, and no disturbance of the intellect, no contraction or paralysis, (Obs. XIX.) I consider, then, that the softening was occasioned by mechanical destruction of the tissue in the first three cases, and by *post mortem* action in the three last. That this conclusion is the correct one will further appear from the following considerations.

Of the four cases where both kinds of softening existed, in the

first, hemiplegia was present on the left side only. After death softening was found in both *corpora striata*, yet exudation corpuscles were only detected in the lesion of the right side, the one opposite to the paralysis, (Obs. IV.) In the second case there was loss of speech, disorganization of the eye, and convulsions before death. There was no paralysis; the man could walk without assistance. Abscesses surrounded by inflammatory softening existed in one hemisphere, explaining the symptoms present. But the central parts of the brain were also softened, causing no symptoms whatever, and on examination this lesion was found to be non-inflammatory, (Obs. XX.) In the third case there was paralysis of both arms, contraction of the right, and tetanic spasms of the muscles of the mouth and neck. Inflammatory softening existed in the *pons Varolii*, extending more to the left side, which perfectly explained the symptoms. There was also softening of the right *corpus striatum*, probably mechanical, certainly non-inflammatory, connected with which no symptoms existed, (Obs. XXII.) In the fourth case there was cephalalgia, prominence of the eye-ball and coma before death; there was no paralysis. After death a fungoid tumour was found at the base of the orbit, and an abscess in the anterior lobe of the brain, surrounded by inflammatory softening. There was also central yellow softening of the left hemisphere, producing no symptoms, (Obs. XXXII.)

An analysis of these ten cases, therefore, leads to the conclusion, that the two kinds of softening we have endeavoured to establish are alike distinguishable, both by their intimate structure and the symptoms accompanying them during life.

### Sources of Fallacy in the present method of examining Lesions of the Nervous Centres.

I shall now inquire how far the observations tend to elucidate the obscurity which confessedly surrounds the pathology of inflammation of the nervous centres. All practical men agree in considering it a matter of extreme difficulty, to reconcile with any certainty the morbid appearances found in the brain, with the symptoms previously observed. The microscopic examinations described serve, in my opinion, to demonstrate some of the sources of error connected with this subject, which in future may readily be avoided. For instance, softening of the *fornix, septum lucidum*, and central parts of the brain, may exist in two cases; to the naked eye they may be in every respect identical, and yet the microscope enables us to determine that the one contains exudation corpuscles, whilst in the other not one of these bodies is to be found. It becomes evident, then, that we have hitherto been confounding two distinct lesions, and that a different train of symptoms should, under such circumstances, be occasioned, is only to be expected. Again, it has frequently excited surprize that, notwithstanding the existence of well-marked symptoms of softening, nothing was to be discovered after death. Now it has been shown in several instances, that although to the naked sight no morbid lesion was apparent, still, portions of brain might contain the same exudation corpuscles as are to be seen in more apparent lesions, and that, by considering such parts diseased, all the symptoms might be explained. By excluding these sources of error, therefore, and by being enabled at once to distinguish the lesion dependent on inflammation, from others which simulate it, we shall be enabled to obtain more exact data for future investigations.



It is not enough, however, to allude to these sources of error, as being *probable* occurrences; it becomes important to establish the two following propositions:

1*st, That pathologists have hitherto confounded softening dependent on inflammation, with softening occasioned by post mortem changes or mechanical violence.*

2*dly, That, notwithstanding the most anxious search, and the existence during life of the most decided symptoms of softening, inflammation, though really present, has escaped observation.*

With respect to the first proposition it may be observed, that, in many cases where no symptoms were present during life, extensive softening of the brain has been found after death. This is a well-known fact, and is one which tends in no small degree to throw confusion on the pathology of nervous diseases. Thus

In Obs. XV. there was extensive softening of the central portion of the brain, *corpora striata*, and optic thalami, which, however, contained no exudation corpuscles. There was also capillary apoplexy. The symptoms were sudden insensibility and convulsions. There was no paralysis or contraction observed.

In Obs. XVI. and XXV. there was circumscribed pultaceous softening of the spinal chord, with absence of exudation corpuscles. There was no paralysis, and the symptoms were those of general tetanus.

In Obs. XIX. there was extensive softening of the central parts of the brain, with absence of exudation corpuscles. The only nervous symptoms were hemicrania and delirium; no paralysis or contraction.

In Obs. XXXIII. there was softening of the central white substance, and the *corpora strata* were broken up by sanguineous infiltration. No exudation corpuscles or granules were present, and the symptoms were, sudden insensibility, convulsions, coma, and death, without paralysis or contraction.

Now, in all these five cases there was an extensive softening, which it was impossible for any one to distinguish positively by

unaided sight, from inflammatory softening. In neither did exudation corpuscles exist, and it is curious that in neither did those symptoms occur which we shall afterwards find are peculiar to similar softenings produced by inflammation.

Here again I may allude to the four cases formerly noticed, (Obs. IV., XX., XXII., XXXII.) where, conjoined with an inflammatory softening, producing particular symptoms, there was also non-inflammatory softening, occasioning no symptoms whatever. The circumstances attendant on these nine cases, then, must convince us that softenings, produced mechanically, or by *post mortem* changes, have frequently been mistaken for those dependent on inflammation, and must necessarily be so, so long as unaided sight is made the sole means of forming a judgment with respect to their nature.

These cases, therefore, I think sufficient to establish the first proposition, viz. that pathologists have confounded softening dependent on inflammation with softening occasioned by *post mortem* changes.

The second proposition, namely, that, notwithstanding the most decided symptoms of inflammatory softening were present during life, and the most careful examination after death, the morbid lesion, though really present, has frequently escaped observation, is clearly established by the following facts.

In Obs. V. a man had paralysis with complete resolution of the limbs on the right side, and intense rigidity of them on the left. Death occurred in six hours. On dissection, a large coagulum of blood was found effused into the left hemisphere, thus explaining the paralysis on the right side. In the right hemisphere an old apoplectic cyst was found, and a number of small cavities, described by Dr Sims as chronic softening undergoing a cure. Here, then, there was nothing acute, nothing to explain the intense rigidity. A microscopic examination demonstrated that these cavities were filled with numerous exudation corpuscles and granules, similar to those found in undoubted inflammatory softening.

In Obs. VI. a man, who had long suffered from a tumour at the base of the brain, was seized, ten days before death, with loss of consciousness, and powerful rigidity of the right extremities. The latter symptoms disappeared in three days, leaving perfect paralysis of the right arm, but, four days subsequently, again returned. On dissection nothing could be observed in the left hemisphere, after the most careful examination, and yet the microscope enabled us to discover numerous exudation corpuscles in the left *optic thalamus* and *corpus striatum*, showing that these bodies were inflamed.

In Obs. XXII. there was hemiplegia of the left side with contraction of the arm, followed by hemiplegia of the left side. There



were also trismus and tetanic spasms of the neck. It was very doubtful on making a section of the *pons Varolii*; whether it was softened or not, its colour and consistence were apparently unchanged. Yet here, again, the microscope demonstrated to all present that numerous exudation corpuscles existed in the part.

What renders these cases so remarkable and satisfactory is, that they are not instances where the dissection was performed in a hurried manner, and by incompetent persons. On the contrary, from the particular symptoms connected with them during life, the *post mortem* examination was in all conducted with extreme care. Drs Spittal, Henderson, and Paterson were each present during the dissection of their respective cases. Dr Peacock conducted the examinations which were witnessed by myself, several clerks, and numerous students, and I may say that we were all in doubt until the microscope cleared up the difficulty.

These observations, therefore, sufficiently demonstrate that the naked sight is positively unable to detect lesions, even although they are directly indicated by the symptoms, and carefully looked for by experienced morbid anatomists.

If, then, the two propositions formerly stated have been satisfactorily proved, and it is agreed that pathologists have been confounding inflammatory with non-inflammatory softening, and overlooking the former although undoubtedly present, it must be evident that many of the contradictions which have existed in connection with the pathology of nervous diseases may be accounted for. It must also be clear, that no confidence can be placed in the analysis of cases, however numerous, when the sources of error now indicated have not been carefully excluded.

The next step in the inquiry is evidently to determine what results may be derived from the thirty-three observations I have furnished, in conjunction with the twelve others recorded by Gluge and Vogel. An analysis of these might, if carried out, give rise in some instances to useful results, but would extend the limits of this paper to a great length. By some the number of observations may be considered as capable of forming the basis of a new inquiry into the subject, yet I have found, on making the attempt, that they are by no means sufficiently extensive to merit confidence, more especially in a semiological point of view. Reflection also has convinced me that it will be useless to proceed farther in any researches respecting inflammation in any particular organ of the body, without first having determined the nature and observed the phenomena of inflammation itself in a general rather than in a special manner. For the present, therefore, I shall content myself with making a few remarks on certain points only, which the preceding observations appear to me capable of eluci-

dating. These are, 1*st*, The colour of softenings; 2*d*, General relation between the symptoms and the seat of the lesion; 3*d*, Contraction of the limbs as a symptom of inflammatory softening; 4*th*, Curability of softening; 5*th*, The connection between softening and hemorrhage.

I. *Colour of Cerebral and Spinal Softenings.*—Softening of the nervous centres may be tinged red, yellow, white or gray, and present numerous intermediate shades of these. These distinctions, however, indicate no essential difference between them, as far as structure is concerned, for we have seen that all these coloured softenings present the same histological characters. As a general rule the red may be considered as acute, the yellow as subacute, and the white or gray as chronic softening. But this is by no means invariable, for we have seen one white softening to be acute, (Obs. IX.)

On what does the difference in colour depend? The red and yellow softenings are evidently connected with the presence of blood, or the greater or less imbibition of its colouring matter. In some cases blood becomes directly effused into the cerebral substance, constituting capillary apoplexy (Cruveilhier), or sanguineous infiltration (Durand-Fardel). In this case it may be of a bright vermilion colour, (Obs. XV. and XXXIII.) or of a purple colour, resembling port-wine lees, (Obs. XXI.) Sometimes a bright rosy blush is spread over a limited surface of the white matter, becoming gradually less towards the circumference, (Obs. I.) This depends upon congestion of the vessels of the part. Occasionally the redness is surrounded by a straw-yellow colour (Obs. X.), or it may be of a rusty-yellow or ochry tinge, as seen surrounding apoplectic extravasations, (Obs. XII. and XIII.) In this case, the blood-corpuscles being broken down, the colouring matter tinges the serous fluid, and gradually permeates the surrounding tissue, (Carswell.)

It may not perhaps occur to many that the real colour of the blood is yellow, yet that this is the case will become evident on examining an isolated blood-corpuscle under the microscope. It is only the number of the corpuscles, or, in other words, the intensity of the yellow which gives it the appearance of redness, as occurs with the tincture or syrup of saffron. The colour which is apparent to the eye is often different from what really exists. Thus a deep-green or Prussian-blue looks black. It is only when diluted that the real colour becomes evident. Hence why, when blood is diluted or diffused over a considerable space, the parts assume a yellow tint, more or less intense.

Sometimes the yellow softening is contained within the reddened portion, and somewhat resembles a purulent collection, (Obs. I.) At others it surrounds the extravasation of blood as is most common. Occasionally we find considerable portions of the white matter tinged of a straw colour, either in connection with extravasated blood, (Obs. X.) or with an abscess (Obs. XXXII.) Lallemand and many others have supposed that yellow softening is caused by the presence of purulent matter, and to the naked eye the resemblance to a purulent infiltration is often very great. In none of the observations detailed, however, does it appear that the colour or consistence of the softening is in any way connected with the presence of purulent matter. I have never yet seen a pus corpuscle in softened brain or spinal marrow. M. Durand-Fardel maintains that the colour is always derived from the blood. It is difficult, however, to account for it when no blood is extravasated, (Obs. XXXII.) In cases where it is conjoined with an abscess, may not the colouring matter of pus be also absorbed?



Fawn-coloured softenings are frequently observed, independent of extravasated blood. As they are generally subacute or chronic, it is of course impossible to determine how far the tint is dependent on the admixture of blood. I have always found exudation corpuscles in these softenings, and think it very probable that the fawn tint occurring in the medullary matter is attributable to the presence of these bodies, which are usually of a brownish or blackish colour.

The softening may be brilliant white, and yet contain numerous exudation corpuscles, which, however, in this case are colourless. (Obs. IX.) In the softening which resembles chalky milk, the white has a dull appearance, and the granules of the exudation corpuscles are large, equal in size, and very transparent. (Obs. XVII.) I have never yet seen a pus corpuscle in them,—a result entirely opposed to the opinion of Gluge, who considers this a common occurrence. His statement, however, is not supported even by his own cases. White softenings in the great majority of instances are non-inflammatory.

II. *General relation between the symptoms and the seat of the inflammatory softening.*—Deducting all the cases of non-inflammatory softening with which no symptoms were connected, and those also of simple hemorrhage, we may divide the remaining 20 observations into three groups.

1. Lesions of the central parts of the brain on one side, ten cases, (Obs. I. II. III. IV. VI. VIII. XI. XII. XIV. XVII.)

2. Lesions of the central parts on both sides, six cases, (Obs. V. VII. IX. X. XVIII. XXII.) In this group is included the case of softening of the *pons Varolii*, (Obs. XXII.)

3. Lesions only of the peripheral parts. On one side three cases,

(Obs. XVIII. XX. XXXI. On both sides, one case, Obs. XXI.)

Each of these groups will be found connected with a particular train of symptoms. Thus, the first group is characterized by contraction or paralysis of the extremities on the opposite side of the lesion. The second group is characterized by the same symptoms on both sides, and the third group is characterized by absence of contraction or paralysis in the extremities and by either delirium or coma.

This analysis, therefore, favours the view which supposes the central parts and base of the brain to be connected with motion and sensation, and the peripheral parts to be connected with intelligence. With respect to the influence of more circumscribed parts, such as the optic thalamus and *corpus striatum*, no positive deductions can be drawn. For this purpose I consider the observations too few, and the microscopic examinations with respect to them not sufficiently exact.

I regret that the want of detail which accompanies Gluge's cases, precludes the possibility of drawing any conclusion from them with respect to the relation between the symptoms, and the seat of the lesion. Obs. XXXIV., for instance, is as follows: "Female, paralysis; pultaceous softening of several points of the cerebrum and cerebellum, both in the gray and white substances."

III. *Contraction of the limbs in inflammatory softening and in hemorrhage.*—Whilst by some more or less contraction and rigidity of the limbs has been considered as highly characteristic of inflammatory softening,—others have maintained that it is altogether incidental, that it often exists when no softening can be found, and that it is as often absent when softening is present. It has also been known to accompany hemorrhages, apparently unconnected with softening. May not this confusion be dependent on the two propositions which we have endeavoured to establish not having been known? Let us then examine what result an analysis of the observations will afford us in connection with this point.

Cerebral and spinal softening was observed in 26 cases. Of these 19 were inflammatory, and 7 non-inflammatory. Of the 19 cases of inflammatory softening, 16 were acute, and 3 chronic. If from the 16 cases we subtract 2 of apoplexy, (Obs. XI.; XII.) and 4, connected with external lesions, (Obs. XIII., XX., XXI., XXXII.,) there remains 10 cases of idiopathic inflammatory softening. Of these 7 cases presented well-marked contraction, and in 3 this symptom was not observed, (Obs. IV., VIII., XVIII.) But in the first of these three cases, three days elapsed before the medical man was called in. In the second case, the symptoms



were avowedly not accurately observed, and in the third case no mention whatever is made either of the presence or absence of contraction. It may be argued, however, that as this last case, (Obs. XVIII.) was in the Infirmary some time previous to the cerebral attack, this symptom, if present, could not have escaped observation. Be this as it may, it offers the only doubtful exception to the occurrence of contraction in acute inflammatory softening. This analysis, therefore, indicates that contraction is a more frequent symptom of inflammatory softening than many suppose.

This result becomes more important when we find it stated that contraction is a frequent phenomenon in cerebral hemorrhage.* In eight cases of this lesion, recorded among the foregoing observations, contraction was not once observed. M. Boudet has laid down the following proposition:† viz. "every time a hemorrhage takes place in the cerebral substance, contraction is not manifested so long as no inflammation is occasioned round the clot. But when to a lesion of the cerebral substance is joined a rupture of the walls of the ventricles, and an extravasation of blood into their cavities, or on the surface of the brain, contraction appears." Durand-Fardel admits that this is frequently the case, but not always. In Obs. XIV. there was hemorrhage into both ventricles, and in Obs. XXIII. into the left ventricle, yet in neither of these cases was contraction present. Again, in Obs. XIII. there was considerable hemorrhage into the arachnoid cavity, with the same absence of contraction. All three observations, therefore, are opposed to the proposition of MM. Boudet and Durand-Fardel.

The latter author, however, has recorded sixteen observations, where contraction was well-marked during life, and where cerebral hemorrhage was found after death. He says nothing, however, of the nature of the lesion surrounding the extravasations, and it is possible that in those cases the hemorrhage may have been preceded or accompanied by an inflammatory softening. This is a point which could only be determined by a microscopic examination. In the eleven cases mentioned by Gluge, the occurrence of contraction is only mentioned twice. In one there was extravasation of blood into, and softening of the left ventricle, (Obs. XXXVII.) But it is distinctly said that exudation corpuscles in great quantity were present. In the other case, (Obs. XXXVIII.) there was deep-red softening of the right hemisphere, also containing exudation corpuscles. We are of opinion that the contraction in both instances is attributable to the inflammation, and not to the accompanying hemorrhage. Without, therefore, denying the possibility of the occurrence of contraction

* Durand-Fardel, Archiv. Gen. de. Med. Juilliet, 1843.
† Memoire sur l'Hemorrhagie des Meninges, 1839.

from simple hemorrhage into the brain, it still does not appear to me that the absence of inflammation in the cases given by Durand-Fardel has been demonstrated.

IV.—*The curability of Cerebral and Spinal Softenings.*—Durand-Fardel observes that the curability of cerebral ramollissement is a fact of which we can no more entertain disbelief in the present day, than we can of the curability of pulmonary tubercle. There can be little doubt that the observations of Rostan, Cruveilhier, Sims, Dechambre, and Durand-Fardel have fully established the possibility of this occurrence. Besides, why should not exudation of blood-plasma into the brain, and the softening there produced by the formation and development of exudation cells, lead to absorption in that organ, as well as in the lungs? We cannot help thinking, however, that the anatomical marks or appearances, by means of which pathologists have endeavoured to *demonstrate* the curability of a softening are very fallacious. The slight indurations occasionally met with in the nervous substance are spoken of by some authors as *cicatrices*,—a term we think wholly inapplicable to them. Durand-Fardel alludes to the softening resembling chalky milk as a proof of the passage of the lesion into a state of cure; and Dr Sims speaks of the fawn-coloured cavities as evincing the same fact. Now, we have seen (Obs. XVII.) that the chalky milk softening contains exudation granules and corpuscles, and that both presented a peculiar appearance. This was a very chronic case, and the symptoms exhibit that the lesion was connected with a hemiplegia of long standing. It is certainly probable, therefore, that the opinion of M. Durand-Fardel is correct, and that the granules composing the softening were undergoing absorption. On the other hand, the lesion described by Dr Sims we have seen (Obs. V.) also to present exudation corpuscles, exactly resembling those in acute inflammations. In this case there was intense rigidity of the opposite side of the body, without any other lesion but the one under consideration, which could have produced it. So far as one observation goes, therefore, the appearance described by Dr Sims cannot be regarded as a trace of cured cerebral softening; and we are further inclined to think that a critical analysis of his cases will not support such a view, even as regards a diagnosis of the disease. At present, however, I content myself, in the absence of further facts, with pointing out the above discrepancy.

V. *The connection between Softening and Hemorrhage.*—The relation between softening of the nervous tissue and hemorrhage has excited much attention. Does the hemorrhage precede and cause the softening, or, on the other hand, does softening ever precede and induce hemorrhage? There are eight cases which



bear reference to this question, (Obs. V. XI. XII. XIII. XIV. XV. XXIII. XXXIII.) Three of these were well-marked cases of sudden hemorrhage into one hemisphere of the brain, causing complete hemiplegia on the opposite side of the body, (Obs. V. XIV. XXIII.) In these cases death took place respectively in six hours, two days, and eight days after the attack. Surrounding the coagulum, the cerebral substance was soft and broken up, apparently from mechanical violence, and contained no exudation corpuscles. In two other cases, similar symptoms were occasioned, and similar lesions found after death, (Obs. XI. XII.) In these death took place respectively in seven days and five weeks. Here also the cerebral substance surrounding the clot was soft and broken up, but contained numerous exudation corpuscles and granules. Thus it would appear necessary for a certain time to elapse before a coagulum of blood can excite consecutive inflammation. In the five preceding cases the hemorrhage occurred into the ventricles, or involved the optic thalamus and *corpus striatum*, producing hemiplegia on the opposite side of the body. In the sixth case, on the other hand, where the hemorrhage followed a blow on the head, the arachnoid cavity was the seat of the lesion. Here there was no paralysis, the man walked perfectly the day before his death. There was, however, great restlessness and delirium, and the periphery of the brain in contact with the clot, was found softened, and contained exudation corpuscles. Death took place thirteen days after the accident. The seventh and eighth cases are instances of capillary apoplexy combined with central softening, which, however, was non-inflammatory.

On examining the mode of accession in the eight cases, we can perceive no reason for supposing that softening or other organic lesion preceded the hemorrhage. In Obs. XV. the apoplectic attack was ushered in by severe cephalalgia, more or less intense, during a period of four months. This, however, occurring in a young girl, was evidently congestive, in no way accompanied by inflammation, and the softening discovered after death contained no exudation corpuscles or granules. In the other seven cases the attack was sudden. We cannot doubt, therefore, that the inflammatory as well as the non-inflammatory softening surrounding the hemorrhagic extravasations in these cases were in all of them consecutive.

It has long been a question how far the softenings, which usually accompany capillary apoplexy, are dependent on inflammation. In his Thesis, M. Durand-Fardel thus expresses himself, "In the same manner that redness is the most certain sign which can aid us in distinguishing acute from chronic softening, in the same manner diminution of consistence is the most positive proof of the presence of inflammation in a sanguineous infiltration, and even the necessary condition, in order that its existence can be ad-

mitted.*" Again, in his recent work, he tells us, "if the softening extends beyond the precise limits of the sanguineous infiltration, if redness surround it, above all, if the blood infiltrated be not in sufficient quantity to have mechanically produced a diminution of consistence, there will be every probability that we have to do with a 'ramollissement,' properly so called, accompanied by sanguineous infiltration, that is to say, an inflammatory affection, and not one merely hemorrhagic. But if, on the contrary, the diminution be slight, and altogether limited to a sanguineous infiltration, if there be an adhesion of the meninges, if the surrounding parts appear perfectly healthy, there is only, doubtless, a simple and primitive sanguineous infiltration, as in the case where the consistence of the brain has remained normal.†" Now, in the two cases we have reported of this lesion, we find in one (Obs. XV.) that all the central white portions of the brain were very soft, and were diffluent. In the second case, (Obs. XXXIII.) the infiltration was more limited, although more intense, and the softening of the medullary substance not so great. Here, probably, M. Durand-Fardel would have considered that a simple or primary sanguineous infiltration only was present. But the distinctions by which this author endeavours to separate the inflammatory from non-inflammatory softening in these cases are very vague; its extent, more or less, the colour, adhesions of the membrane, these, certainly, are not marks which will enable the morbid anatomist to speak with precision on these points. On the other hand, let us regard the microscopic examination, and we find that the lesion in both cases adduced are identical. That there are none of the corpuscles we have invariably found in unequivocal inflammatory softening, and, therefore, we hold the lesion to be non-inflammatory. Then, when we regard the symptoms, we only find from the similarity of both, and absence of those which accompany inflammatory softening, a further confirmation of the same truth.

No doubt the observations which have been detailed are capable of furnishing data for many other discussions connected with inflammation of the nervous centres. There are also other lesions dependent on this morbid process, such as induration, the occurrence of abscesses and tumours, which have received little attention. The subject of arachnitis and the exudation of lymph has also been purposely avoided, as I consider such lesions to be more connected with inflammation of the serous membranes than of the nervous centres. As I am far, however, from considering the inquiry perfect, I shall now pause, with the intention of resuming it at a subsequent period.

The following conclusions may, I think, be drawn from the foregoing observations.

1. That two kinds of cerebral and spinal softening exist, an inflammatory and a non-inflammatory, which may always be distinguished from each other by means of the microscope.

2. That inflammatory softening is characterized by the presence of exudation corpuscles and granules, whilst in non-inflammatory softening these bodies are never found.

3. That the nature of inflammatory softening consists in the formation and development of nucleated cells in exuded blood plasma; whilst the nature of non-inflammatory softening consists in the mechanical destruction or maceration of the nervous tissue in serum, or is the result of putrefaction.

4. That non-inflammatory softening, unaccompanied by hemorrhage, is usually *post mortem*, and causes no symptoms; whilst uncomplicated inflammatory softening always causes marked symptoms, which, however, vary according to the seat of the lesion.

5. That the inflammatory and non-inflammatory softenings have frequently been confounded together by morbid anatomists, it being impossible to distinguish one from the other, with any certainty, by the naked eye.

6. That inflammation in the nervous centres has, in several instances, been demonstrated by means of the microscope, after it had escaped the search of good morbid anatomists, and been indicated by the most unequivocal symptoms.

7. That every different coloured softening has, at various times, been found to be connected with inflammation, but that yellow and white softenings are most frequently non-inflammatory, whilst the fawn-coloured softening is commonly inflammatory.

8. That red softenings usually depend on congestion, or the direct extravasation of blood; yellow softenings, on the imbibition of the colouring matter of the blood; fawn and gray-coloured softenings on the presence of brown exudation corpuscles; and white softenings, in the great majority of cases, are *post mortem* and the result of maceration in serum.

9. In no single instance has softening of the nervous centres been traced to the presence or infiltration of pus.

10. That inflammation of the central parts of the brain generally produce well-marked lesions of sensation and motion, whilst, in inflammation of the peripheral portions, lesions of intelligence are commonly well pronounced.

11. That in idiopathic inflammatory softening of the brain, contraction in one or more limbs is a common symptom.

12. That the fawn-coloured spots described by Dr Sims are no evidence of the cure of inflammatory softening.

13. That inflammation accompanying hemorrhages is usually consecutive.

14. The softening surrounding apoplectic clots or sanguineous infiltration is no proof of inflammatory action.

* Thèse, 1840, p. 92. † Traité du Ramollissement du Cerveau, 1843, pp. 71–2.



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ON

# ABNORMAL NUTRITION,

AS OBSERVED IN

## SOFTENING, SUPPURATION, GRANULATION, REORGANIZATION OF TISSUE, MORID GROWTHS, &c.

BY

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*Abstract of a Communication made to the Medico-Chirurgical Society of Edinburgh, Nov. 9, 1842.*

Dr Bennett commenced his communication, by alluding to the well-known fact, that the blood circulating to every part of the living organism, carried with it the principles of nutrition. These appear to exude through the minuter vessels dissolved in the liquor sanguinis or blood plasma, which constituted a blastema or formative fluid for the formation of nucleated cells. The cells thus formed, underwent different kinds of development, some being formed into bone, others into muscle, nerve, tendon, filamentous tissue, and so on. The insensible formation and development of these cells constituted healthy nutrition.

This process might be deranged, or rendered abnormal, in various ways: 1*st*, from an increase or diminution in the whole mass of the blood; 2*dly*, from a greater or less change in the relative amount of its different chemical constituents; and, 3*dly*, from mechanical and other causes acting more especially upon any part of the frame. It was to the phenomena accompanying the latter condition that Dr Bennett was desirous of directing the Society's attention. These were rapidly described, as they have been observed by numerous authors, and confirmed by Dr Bennett, viz. 1*st*, Contraction of the capillaries, and diminished velocity through them of the flow of blood; 2*dly*, Dilatation of the capillaries, and diminished velocity of the blood's current; 3*dly*, Oscillation of the column of blood, and encroachment on the lymph spaces; 4*thly*, Complete stagnation of the blood, the red corpuscles crowded together in an amorphous mass, and brought into immediate contact with the vascular walls.

During the latter stage of this process, or at its termination, three circumstances might take place: 1*st*, Effusion of serum; 2*dly*, Exudation of blood plasma; and, 3*dly*, Extravasation of blood by rupture of the vessel.—The object of the communication was to describe the changes which followed exudation of the liquor sanguinis.

The blood plasma on being exuded from the blood-vessels, might remain fluid for some time, and would then be necessarily re-absorbed. Vogel and Vogt refer to cases where on cutting across small cavities in the brain, the fluid they contained immediately coagulated. More frequently, however, instead of remaining fluid, the blood plasma coagulates. When this has once occurred, it undergoes changes, which vary in different cases, before it can be re-absorbed or removed from the system. The material exuded constitutes a blastema for the formation of nucleated cells, which generally, though not always, vary in character according to the nature of the tissue in which the exudation takes place.

In parenchymatous organs, the liquor sanguinis usually coagulates in the form of granules, which may be seen coating the vessels, and filling up all the space between the ultimate tissue of the organ. By this process, the organ affected is rendered perfectly dense or hepatized. After a time, or during the exudation, nucleated cells, (*exudation corpuscles,*) are formed, which vary in size from 1-100th to 1-25th of a millimetre in diameter. They become filled with granules from 1-500th to 1-700th of a millimetre in diameter. The cell wall then bursts, and the granules escape. By means of this process, and the development of the exuded mass more or less into cells, it is broken up, and rendered fluid. Thus the morbid state in organs, named *softening*, is produced.

The exudation corpuscle may be distinguished by its undergoing no change on the addition of acetic acid. Ether and caustic potash entirely dissolve them; liquor ammoniæ renders them soft and easily broken down.

On the surface of serous membranes, the exudation generally passes into cells and very minute fibres. These cells, (*plastic corpuscles,*) are transparent, from 1-100th to 1-75th of a millimetre in diameter, formed of a delicate wall, containing granules 1-1000th to 1-600th of a millimetre in diameter, varying in number from 3 to 12. They are not perfectly round, but somewhat irregular in form. The mode of formation of the minute fibres is unknown. Gulliver has pointed out that they are not the result of cellular development.

The plastic corpuscle may be distinguished by its wall contracting, and the edge becoming thicker on the addition of acetic acid. The shape is also rendered more irregular; it is dissolved in ether and caustic potash, and not affected by water.

In the skin, loose cellular tissue, &c., the exudation commonly passes into cells, usually from 1-100th to 1-120th of a millimetre in diameter, perfectly round, with a defined edge, containing several granules, and sometimes a round nucleus. These cells, (*pus corpuscles,*) swim in a fluid, roll freely on each other, are of a yellow-greenish colour, and constitute the organized part of the fluid universally known as *pus*. They are not formed from the exudation corpuscle, or epithelial cells, as has been supposed, but arise primarily from the exuded blood plasma.

The pus corpuscle may be distinguished by its swelling out and becoming more transparent on the addition of water; by the cell wall being dissolved, or nearly so, in acetic acid, whilst the nucleus is rendered more distinct in the form of two or three granules, generally from 1-300th to 1-400th of a millimetre in diameter. They are dissolved in ether and concentrated alkalies.

The exudation, plastic, and pus corpuscles, although most commonly formed in the situations referred to, are not exclusively so. The pus corpuscle may sometimes be formed in parenchymatous tissues, and exudation corpuscles in cellular tissue. Sometimes they may be more or less mixed together. Thus the plastic and exudation corpuscles are commonly formed in the lung, and exudation corpuscles may frequently be found swimming among those of pus.

The exudation may also pass into *organization of tissue*, apparently by the same process as takes place in a state of health. Should it exist in small quantities, and further exudation be checked by bringing the divided parts into apposition, re-organization of tissue occurs *rapidly*, and *union by the first intention* is established. On the other hand, when this process takes place *slowly*, a state called *hypertrophy* is produced.

When loss of substance is occasioned, the exudation passes partly into organization of tissue, and partly into pus corpuscles, by means of which a *granulating surface* is produced. A fungous granulation examined under the microscope, exhibits all the stages of development presented by cells, passing into fibres, as figured by Schwann. Externally these are covered with pus corpuscles. As the former increase the latter diminish, until at length a normal tissue is reproduced, or a dense fibrous mass denominated *cicatrix*.

Lastly, the exudation may be transformed into nucleated cells of different shapes, round, oblong, caudate, stellate, more or less square, &c. &c., either mixed or unmixed with fibres, constituting the different kinds of morbid growths, as indicated by Müller.

Thus in the same manner as in a state of health, cells originating in the effused liquor sanguinis, may undergo different kinds of development, as into fibre, muscle, nerve, &c., constituting *normal* nutrition; so in a morbid state cells originate in the exuded liquor sanguinis, which are transformed into exudation, plastic, pus cells, tumours, &c., constituting *abnormal* nutrition.



Dr Bennett agreed with Andral and Magendie in considering that the term inflammation was inapplicable to the explanation of the phenomena he had described. He pointed out how the cardinal symptoms of inflammation, pain, heat, redness, and swelling, were partly dependent on the exudation, and partly on the congestion which preceded it. He had even seen some cases of encephalitis, where the central parts of the brain were softened, and contained numerous exudation corpuscles, although during life no pain or heat, and after death, no redness or swelling had been observed.

Inflammation, therefore, was only a part of one great morbid action occurring in the frame, which might be denominated abnormal nutrition, and more especially that species of it dependent on increased exudation of liquor sanguinis.

Numerous authors had referred inflammation to increased nutrition or secretion. Dr Alison more especially seemed to consider this essential to the inflammatory process, (Lib. of Med., Art. *Inflammation.*) Before the doctrine of cyto-genesis was established, however, nutrition of parts was invariably connected with vascularity, and pus was considered an unorganized fluid. At present we must regard pus, lymph, softening from exudation, &c., as being highly organized, and resulting from an active process of nutrition. Hitherto increased nutrition, as connected with inflammation, has been mere hypothesis; Dr B. stated, that it was the object of his communication to *demonstrate* its correctness.

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# REMARKABLE CASE

OF

# EXTROPHY OF THE URINARY BLADDER,

WITH REMARKS.

By P. D. HANDYSIDE, M. D., F. R. S. E.

Lecturer on Anatomy and Physiology.

*(From the Edin. Med. and Surg. Journal, No.* 141.*)*

ALTHOUGH there are on record many cases, and a few well-digested accounts * of this connate deficiency of the urinary organs, yet, as the appearances of the malformation in the present instance, vary in some interesting particulars from what have been observed in other cases already recorded, I am induced to narrate shortly the details of these peculiarities.

James Forbes, from Campsie, Stirlingshire, aged 42, who since early life has been employed as a gardener, found it necessary eight years ago, to leave his occupation in consequence of severe chronic rheumatism, affecting particularly the articulations of the lower limbs. More lately, he has suffered under a protracted attack of rheumatic fever, accompanied by a severe affection of the articular apparatus of the left knee and hip-joints, which has terminated in luxation of the *os femoris* on the *dorsum ilii*, and consequent shortening of the limb. His constitution was formerly robust, and his body vigorous, though latterly his strength has

* See Vols. i. p. 39, and iv. p. 32 of this Journal;—Dict. des Scien. Med. xiv. 344, *Art. Epispadias*;—Cyclop. of Anat. and Phys. *Art. Bladder*, p. 391, &c.

become much impaired, and his body emaciated, and now he suffers considerably more than he used to do from a malformation in the genito-urinary organs, a great part of the urinary bladder being everted, and its delicate mucous surface likewise in a very irritable condition.

In height, this man measures five feet four inches and seven-eighths, while between the extremities of his middle fingers, his arms being fully expanded, he measures six feet two inches and seven-eighths. This disparity is remarkable, for although between eight and ten years ago, a curvature forwards in the dorsal region of the spine contributed materially to lessen his stature, yet very nearly the same amount of disproportion in his body was congenital, since we find that his height at the period of maturity did not exceed five feet nine inches.*

At birth the subject of his narration was observed to have in the hypogastric region, a small reddish tumour, to the upper part of which the umbilical cord was attached; but all trace of the latter disappeared very shortly afterwards. He is the oldest of a healthy family of seven, (four of which number are males), and is the only one among his relatives exhibiting any malformation. As he advanced to maturity, the tumour increased rapidly, though not in an equal ratio to what it latterly has done, since eight years ago, it was in bulk one-half smaller in every way than it now is, and about three years ago, when I first saw him, it was one-fourth smaller in size than at present. It now presents the following characters. [See Plate IV.]

The anterior wall of the hypogastric region of the abdomen in the situation of the lower third of the *linea alba* is deficient at a part corresponding to the base or neck of the tumour, which consists of the everted posterior wall and lower fundus of the urinary bladder, protruded so as to form an elongated oval eminence, having its long axis placed transversely. The skin of the abdomen continuous with the upper part of the neck of the protrusion presents a triangular cicatrice two inches and a half broad, by one inch and a quarter in elevation, the base of which unites with the surface of the bladder. The integument closely bordering on the

* It is perhaps not superfluous here to remark, that, six years ago, I made a series of careful observations with the view of ascertaining the accuracy of a measurement of the expanded human body given by Du Piles, as taken from the statues of the ancients by M. du Fresnoy, and which measure is by artists assumed to be true in nature, viz. that "a man, when his arms are stretched out, is, from the longest finger of his right hand to the longest of his left, as broad as he is long." (See Sir Joshua Reynolds' Works, by Malone, edit. 1809, Vol. iii. pp. 115, 116.) By induction from the first twenty-five experiments of this nature made by me, I found that, at the period of maturity, there is a preponderance in the breadth over the height of the expanded body, amounting on an average to rather more than two inches and a half.



remainder of the neck of the tumour presents a similar opaque and cicatrized appearance.

The surface of the extrophied bladder is composed entirely of mucous tissue, with the exception of, *first*, a narrow portion on the upper surface of the neck of the tumour, continuous with the cicatrized skin already adverted to as marking the attachment of the umbilical cord, and *secondly*, an insulated triangular portion of small size on the anterior surface of the left side of the tumour. Both of these spaces are covered with skin and epidermis, exhibit irregularly undulating borders, and resemble old cicatrices. No change in the relative size or general appearance of these spots has been observed.

The mucous surface just referred to is of a florid colour, of a smooth and fine villous appearance when examined under a lens, and it is exquisitely sensitive. For partial defence of this delicate surface it is covered altogether with an exudation of thin mucus. This secretion, however, is, from the high temperature of the part, (afterwards to be noticed), constantly being inspissated, and acquiring the character of loose opaque shreds or laminæ, which in their turn are detached by the mucus effused beneath, so that the surface is, notwithstanding, kept constantly bedewed with this secretion. So sensitive to the touch and to the influence of a cool atmosphere is this surface (which, especially during the prevalence of frost, or previous to its approach, is very delicate and painful,) as to require the individual to guard it from exposure to the air, or to any irritation, with as much care as possible. This he succeeds moderately well in doing by the use of a shield made somewhat after the pattern recommended and figured by Dr Duncan.*

On the lower surface of the protrusion is the well-marked *trigone*, bounding which space posteriorly, and at the distance of one inch and a half from each other, and three-fourths of an inch from the penis, are the apertures of the ureters, the left at the distance of one inch and an eighth, and the right three-eighths of an inch distant from the mesial line of the body. The border of the aperture of each ureter is surmounted by an elliptical projection of mucous membrane, which, from its thickness and obliquity, prevents the free escape of the urine. Nevertheless, this fluid is observed constantly and involuntarily to ooze out of the left ureter, the orifice of which is a little wider than that of the right; while, on the other hand, the upper surface of the penis being in close contact with the latter opening, operates as a valvular hindrance in opposing the free escape of the urine through it. The individual possesses, however, a power of propelling at pleasure a small stream of urine from the left ureter, and when the tumour is

* See Plate iii. in Vol. i. p. 140 of this Journal.

gently raised from the penis, he can, by powerfully contracting the diaphragm, abdominal muscles, and *levator ani*, urge forcibly a stream of urine from both ureters simultaneously. This flow of urine is rendered freer by previously dilating the orifices of the ureters, by introducing along them for about half an inch a moderately sized bougie. Beyond this distance these canals appear to be much dilated and very tortuous, constituting apparently supplementary bladders or receptacles for the urine. The correctness of this suppositon I was enabled to put to the proof by plugging tightly the orifices of the ureters on one occasion for the period of two hours, and on another occasion for two hours and a half, so as to confine the urine within the dilated ureters. These experiments (which I repeated) produced in about an hour from their commencement, a sensation of great distension in the upper inguinal regions, and along the spermatic chord, attended with considerable uneasiness and pain, and a manifest recession of the protruded bladder, with a contraction of it in all its diameters. At the close of the experiments, I raised the tumour, and, much to the relief of the individual, removed the plugs, when a very little urine began to flow from each ureter; but on the introduction of my finger along the rectum, and the elevation by this means of what seemed to be a watery sac or dilatation, the urine was discharged abundantly, and exhibited a well-marked straw-colour, whereas, in ordinary circumstances, this fluid is voided quite transparent in appearance. It may be added, that the flow of urine has always been regular and uninterrupted, and the quantity of it discharged in the twenty-four hours amounts on the average to six pounds. Its constituents, however, are not altogether healthy, a sufficient quantity of albumen existing in it to form a precipitate on boiling, and there are present also about ten per cent. of thick and very viscid mucus. Farther, a round soft pellet of a white deposit like moist pipe-clay, of the size of a large pea, and composed of the ammoniaco-magnesian phosphate, entangled in this ropy mucus, has, during the last nine months, been voided along with the urine from the left ureter every morning.

The ordinary specific gravity of the urine varies from 1009.4 to 1022.1, and the specific gravity of that collected in a vessel between six P. M. and half-past one A. M., amounts to 1020.5. Fifty minutes after having taken one ounce of the infusion of rhubarb, the specific gravity rose from 1009.4 to 1022. Forty minutes after this, (an interval during which the urine was forcibly retained in the ureters by firm plugs introduced into their orifices,) its specific gravity rose to 1020.5;—however, one hour and fifty minutes afterwards, (the ureters having still been kept closed,) the specific gravity of this fluid when forcibly expelled was found to have fallen to 1010.4.



The following are the measurements and external relations of this extrophy of the bladder.

The length or transverse diameter of the tumour when in its ordinary relaxed state, (the individual being seated,) measures four inches and a half, its breadth or vertical diameter two inches and a half, and its depth or antero-posterior diameter, *i. e.* its elevation from the skin of the abdomen, one inch and five-eighths. This last diameter is, however, during any muscular exertion increased to three inches. When the body is placed in the horizontal posture, and is quiescent, the transverse diameter of the tumour is reduced to three inches and a half, the other diameters remaining as before; but after a night's rest in bed, the whole protrusion is reduced to the size of a large plum. When, however, attempts are made in ordinary circumstances, to retract the protruded mass, by calling into powerful action the muscles of inspiration, the tumour appears to be lessened in all its dimensions, its measurements being reduced to these; length three inches and a half, breadth one inch and a quarter, depth one inch. This diminution in its various diameters takes place synchronously with the contraction of the abdominal muscles, and may possibly be referred altogether to their action; yet an attentive observation of the surface of the protrusion during contraction, leads to the more probable conclusion, that in itself it evidences the possession of a distinctly fibrous or muscular coat. Again, upon plugging the ureters, the lower part of the bladder appears to retire or be drawn inwards, and the whole then assumes a collapsed and somewhat corrugated appearance.

A probable reason for the volume of this tumour being so variable is, that internally it constitutes a herniary sac, in which rest many convolutions of the small intestines. These indeed may, during expiration, be readily recognized as occupying this position, by the undulatory movements then perceptible through the very thin and attenuated texture of the parietes of the abdomen, immediately above and around the edge of the tumour.

The subject of this case has never been able to occupy any other posture when laid down, than resting on his back or his right side.

The *temperature* of this everted mucous surface, as indicated by a very delicate thermometer employed in an apartment the air of which was so low as 40°, amounted to 98°, while the temperature of the interior of the ureter (the bulb of the instrument being introduced for one inch and a quarter along the canal,) amounted to 99½° Fahrenheit.

In the present, as in much the greater number of narrated cases of this congenital malformation, a separation anteriorly of the bones of the pubes is found to exist, no symphysis (properly so named) being present. The *ossa pubis* appear in this instance

to be present throughout, although the summits of their spine are widely separated from each other to the distance of seven inches and a half, and are apart from the mesial line half that distance.

The *recti* muscles of the abdomen maintain their ordinary attachments to bone, but five inches above the tumour their mesial margins form, with the superior margin of the neck of the tumour, a triangular space, the area of which corresponds with the expanded *linea alba*, and that cicatrized spot formerly described as marking the seat of the umbilicus. The *pyramidales* muscles are of course wanting.

The remaining measurements of the pelvis are the following: Between the anterior superior iliac spines across the hypogastrium, 1¼ inches; do. on a plane surface, 12½ inches; do. across the last lumbar spine, 16½ inches; between the anterior superior iliac spine and the pubic spine, 5 inches; between the tuberosities of the ischium, 4½ inches. Again, the distance of the *scrobiculus cordis* from the neck of the tumour is 11½ inches; the latter from the pubic spine, 2 inches; from the anterior superior iliac spine, 6 inches; and from the *os coccygis*, 6¼ inches.

The *penis* is adherent to the *trigone* of the everted bladder, but the *glans* alone is perceptible, which is cleft and imperforate. In length it is an inch and a half, in breadth two inches, and in depth (laterally to the frœnal cleft) seven-eighths of an inch. The anterior two-thirds of its upper surface or dorsum present a flattened shallow groove or gutter, on which the urine in part falls, and this gutter is terminated laterally by an edge or border about a line in extent. The posterior third is surmounted by a triangular elevation, exquisitely sensitive, resembling and corresponding to the *verumontanum urethræ*. The orifices of the two seminal ducts are situated at three-eighths of an inch distance from each other, and three-fourths of an inch from the side of the penis, and they open on the verumontanum; while on and around this elevation are several mucous lacunæ besides, one of which, placed in front, resembles the *lacuna magna* in its size, and in its extending backwards. The *glans penis* is devoid of præputial covering above, but below it is invested by prepuce, which anteriorly forms a corrugated semilunar frœnum, and laterally is prolonged upon the integument of the scrotum. The glans is capable of erection; in colour it is natural; the verumontanum and urethral groove present also their natural bright rose-tint. The *corpora cavernosa* are not distinguishable. The penis does not arise from bone through the medium of crura, but is attached to a dense ligamentous band, that may be felt by the finger introduced *per anum*, extending transversely across between the ascending *rami* of the pubes. These ridges of bone are four inches distant from each other. Towards its attachment to this transverse band, the neck of the bladder and adjacent portion of the *trigone* may at the same time be perceived drawn inwards and downwards at a very acute angle; and here the amount of thickness of parts between the surface of the abdomen and the finger does not exceed half an inch.



The *prostate gland* during this examination is not to be felt, although very probably it is present, as is manifestly indicated by the existence of a strong sexual appetite.

It is probable likewise that the *vesiculæ seminales* exist, although they too are imperceptible, since a very abundant secretion of mucus is discharged at the seminal orifices.*

The *scrotum* in form is a small, triangular, and elongated pouch; in length, measured from the *frœnum præputii* downwards, it amounts to three inches and a quarter, and at its lower half it is corrugated, collapsed, and empty. The *raphé* is well defined. The *testes* are of their natural size; they descended from the abdomen at the usual period, and occupy the base and upper third of the scrotum, where they may be at once recognized, the left one hanging a little higher up, and projecting a little further forwards than the right. Their secretion is regular and natural. The *vasa deferentia* are distinct; they can readily be felt by the fingers, and terminate naturally.

The spermatic cords are large, but no power, such as the *cremaster* confers, of retracting these or the testes towards the abdomen, exists in this case of extrophy. The individual is subject occasionally to hernia on both sides after any great exertion or fatigue in walking, or too laborious employment. He has, however, been less subject to this condition lately, though simply of course from having avoided the cause.

The anus is placed so far as two inches in advance of the coccyx, and only one-third of an inch from the base of the scrotum.

In the second part of this paper, I shall offer some observations on the structure and peculiarities of the mucous surface of the urinary bladder, and notice its secretion. I shall inquire also into the nature of the influence which the bladder is supposed to exert directly or indirectly, in producing certain modifications in the urine. And, finally, I shall detail a series of experiments and results, (for performing and obtaining which this case of extrophy has afforded so favourable an opportunity,) on the rapidity with which various colouring, saline, and smelling substances, &c. after being exhibited, appear in the urinary secretion.

* See Dr Davy's recent researches on the fluid of the *Vesiculæ Seminales* in Man in this Journal, Vol. L. pp. 12, 13, note.

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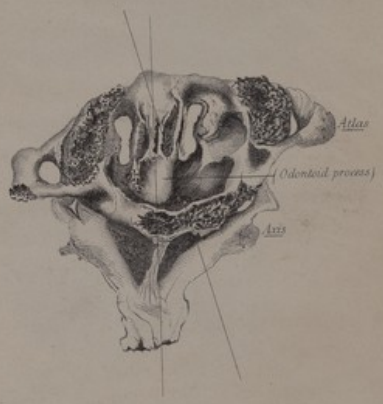
Fig. 1.

Fig. 2.

Fig. 3.




# ACCOUNT

OF A REMARKABLE

# CASE OF SUICIDE,

WITH OBSERVATIONS ON THE FATAL ISSUE

OF THE

## RAPID INTRODUCTION OF AIR

IN LARGE QUANTITY INTO THE CIRCULATION

DURING SURGICAL OPERATIONS.

BY

P. D. HANDYSIDE, M. D., F. R. S. E.,

LECTURER ON ANATOMY.

[WITH SKETCHES OF THE SUPERFICIAL INCISIONS.]

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(From the Edinburgh Medical and Surgical Journal, No. 134.)

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MDCCCXXXVIII.

# ACCOUNT, &c.

On Saturday, February 18th, 1837, at half-past ten A. M., I was called to afford assistance in the case of Mr John Doherty, aged 36, who was then resident in Edinburgh during the first year of his medical studies, and who had a few minutes before met with his death from severe wounds in the neck made with a razor. I saw the body of Mr D. ten minutes after the incisions which had caused death had been made. It lay fully clothed and extended upon the floor of the bedroom, with the head towards the door. The fore-part of the body, and the back of the hands were in contact with the floor, and the razor stained with blood lay at the distance of about two inches from the open right hand. Respiration had ceased, and the pulsation of the heart and arteries was gone. There was no hemorrhage, scarcely indeed any oozing of blood, and not above one pound and a half of this fluid, and that for the most part venous, had escaped from the divided vessels. This blood lay, partially coagulated, upon three different parts of the floor of the apartment.

I immediately resorted to some of the usual methods employed for effecting recovery from asphyxia, caused by the entrance of air into the heart, but without any success.

I then examined the condition of two irregular incisions which I found upon the neck. The wound upon the left side was the smaller, and appeared from various circumstances to have been the first which was made. It extended obliquely downwards from the lobe of the ear, towards the junction of the body with the left cornua of the *os hyoides*, measured two inches and a half in length, and the angle of the jaw was one inch above the middle of it, and it appeared from its direction to have been inflicted with the instrument held in the left hand of the individual. (See Plate, Fig. 1.) The incision upon the right side of the neck was the larger, being four inches in length, and in making which one superficial

and two deep wounds had evidently been inflicted, and, if not by another person, with the right hand of the deceased himself, as was evident from the appearance of the edges of the incision. Its middle part corresponded likewise to the angle of the jaw, though placed half an inch beneath it. It may be added, that in making this very irregular incision, a slight wound had also been inflicted on the skin over the angle of the jaw. (See Plate, Fig. 2.)

Although I ascertained upon inquiry that Mr D. had been ambidexter, still, from the unusual position of the wounds and other circumstances peculiar to this case, I requested the valuable advice of Dr Christison, who concurred with me in opinion that the case should be judicially examined. I accordingly obtained a warrant for making an anatomical inspection of the body in order to discover the cause of death, which I undertook with the assistance of Mr Hutcheson, surgeon, Dr Houseman, Mr Atkin, and others, provided with means for performing with accuracy those experiments on the state of the blood-vessels which, in the event of finding no cause of death apart from the entrance of air into the divided vessels, seemed to me desirable, in order to be enabled to pronounce satisfactorily upon the subject.

### *Sectio.*

The body was examined twenty-six hours after death, an interval during which the weather had been extremely dry and cold, and the body retained in an apartment equally so; and there was not the slightest trace of putrefaction apparent.

The integuments surrounding and implicated in the wounds were carefully removed and preserved, in order to exhibit the form of the incisions, which was next faithfully transferred to a plaster cast of the neck and head.

It was then found that on the *left* side the *platysma myoides*, to the breadth of two inches and a half, the anterior two-thirds of the *sterno-mastoid* with the trunk of the *spinal accessory* nerve, and the lower margin of the *parotid gland*, had been freely divided. Of the parts beneath, the conjoined origin of the *occipital* and *posterior auris* arteries, with the *posterior facial* vein, were found cut across; and through the latter of these vessels several globules of atmospheric air were found to have entered the *internal jugular* vein.

The incision on the *right* side, which was much deeper, and made evidently by three separate strokes of the cutting instrument, was found to have laid freely bare the *transverse process of the atlas*, and to have opened up the space which intervenes between it and the transverse process of the *axis*, sufficiently to



expose to view the *vertebral artery*. The following parts were discovered to have been also freely divided;—the *platysma myoides* to the breadth of four inches, the *sterno-mastoid* with the trunk of the *spinal accessory* nerve, the *external and internal jugular* veins, the *superficial cervical and auricular branches* of the third cervical nerve, the *anterior and posterior facial* veins, with the inferior border of the *parotid gland*, and the posterior margin of the *submaxillary gland*; the *digastric and stylo-hyoid* muscles, the *levator anguli scapulæ*, the anterior margin of the *splenius capitis*, and highest insertion of the *splenius colli* muscles; the *pneumogastric*, and anterior branches of the *descendens noni* nerves, and the *posterior auris* artery. The *facial* artery near its origin was found to have been opened slightly.

On examining with great care the contents of the blood-vessels, I ascertained that the *internal jugular* veins, though empty of blood, were slightly distended with air. The arteries of the neck generally, were empty, with the exception of the left carotid, which contained a considerable quantity of air. The *middle* and the *inferior thyroideal* veins, and, on opening the *thorax*, the *venæ anonymæ*, the *descending vena cava* and the *vena azygos* were found partially distended with air, besides containing a little fluid blood.

On opening the *pericardium*, the cavities of the heart were found collapsed, and nearly empty. The *right auricle* was perfectly empty of blood, with the exception of a minute coagulum at the *foramen ovale*, which (as I have had occasion to observe in the average of one out of every eight cases in the adult) was patulous. This cavity contained some atmospheric air. The *ascending vena cava* contained a little uncoagulated blood, and air. The *coronary* veins and *right ventricle* were empty of blood, but contained air. The *pulmonary artery* and its minute ramifications contained a very little frothy blood, quite insufficient to separate their walls, which were collapsed; while again, the *pulmonary veins*, from their commencement to the left auricle, were in a state of distension on the left side, and in a state of partial distension on the right, from a commixture of dark-coloured blood in a fluid state, and atmospheric air. The substance of the *lungs* was distinctly emphysematous. The left *cavities* of the heart were found perfectly empty of blood, but in a state of partial distension like the other cavities of this organ, from the presence of air. The *coronary arteries* were empty of blood, but contained globules of air. The texture of the heart was paler in colour than natural.

On opening the *abdomen* I found the *vena cava* and the larger venous trunks to a greater or less degree distended with air, and containing very little blood, and that in a fluid state. On

cutting into the *liver* under the surface of water, after a manner similar to that followed in all the preceding and subsequent experiments, air was observed to escape from the *hepatic veins*; and on treating the *spleen* and *kidney* in a similar way, like results were obtained. The *pancreas*, and the *coronary veins* of the stomach presented also the same results. The abdominal *aorta*, on being carefully insulated for three inches in extent by ligatures applied above and below, and also to its branches, and then placed under the surface of water, gave vent on being opened to several globules of air.

The *femoral* and *popliteal* and the *brachial* arteries, upon being similarly treated were observed to contain air.

All the *viscera* of the *thorax* and *abdomen*, with the exception of a few slight adhesions observed between the *pleura* of the lung and that covering the *pericardium*, and some patches of coagulable lymph, not recently effused, found over the right side of the heart, were perfectly healthy. The liver, *pancreas*, spleen, and stomach, were paler in colour than natural; the stomach was empty, and the gall-bladder was distended with bile.

The *muscles*, with the exception already given, were natural both in colour and texture.

That the air found in the blood-vessels in the foregoing case was not effused as a result of the putrefactive process, appears, not only from the circumstance of the shortness of the interval and other circumstances that elapsed from the death of the individual to the examination of the body, but from the consideration also, of that air having been found commixed after a frothy manner with the blood in the vessels, an appearance which is not compatible with simple decomposition, though the converse of this, (the air and blood remaining wholly unmixed after violent death) has been occasionally observed.

Having remarked in turning over the records of cases bearing on the subject of the present communication,* the very scanty and unsatisfactory amount of the details of the necroscopic appearances which the narrative of almost all of these cases presents,†

* For an able analysis of these cases, which supplies the place of any historical summary that I might have offered here, I beg to refer to the American Cyclop. of Pract. Med. and Surg. Part iii. p. 263, Philadelphia, January 1834, Art. Air, by Dr Warren of Harvard University, as well as to the recent work by the same author, "Surg. Obs. on Tumours," p. 250—301; to some valuable editorial remarks on these cases in the 40th Vol. of this Journal, p. 554, and to Dr Cormack's Prize Thesis, p. 21, Edinburgh, 1837. Dr. Cormack has contributed to our knowledge of this subject by giving the details of several additional experiments which he performed on the lower animals.

† As exceptions, I may mention the case of M. Beauchene, which occurred in the Hôpital St Antoine, Paris, in 1818, and some of the details of which are given in Magendie's Journ. de Physiol. Tom. i. p. 192, and Dupuytren's case narrated in the Archiv. Gen. de. Méd. Tom. v. p. 430. Paris, 1824.



I have been induced to communicate an account of the appearances observed, and the results of some careful experiments on the state of the blood-vessels made, in the present instance, soon after death. And I shall now subjoin, as suggested by the consideration of this and other cases, such remarks as appear to be fair deductions from the data we now possess, in connection with a subject, the entry of air into the veins, which, whether considered in reference to its bearings on practical surgery, or in relation to suicide, to physiological or to pathological investigation, may be regarded, certainly, as one of unusual interest.

### *The Cause or Causes of the entrance of Air.*

In instituting an inquiry into the mode in which air may, during a surgical operation, or in a case resembling the present, enter a divided blood-vessel, I would submit the following observations.

The admission of air must depend, *first*, upon the patulous state of the wounded vessel being maintained, which in the case of a vein is,—in consequence of the want of rigidity in its coats, and hence its great tendency to collapse,—effected either by the adhesion of its thin and pliant walls to the contiguous tenser textures, as is observed to take place in certain positions of parts of the body, or by its being kept from collapsing, by its situation in respect to larger veins, for example, one of the *thyroid* veins entering transversely the *internal jugular*;—or again, by its being adherent to or imbedded in the texture of a firm tumour,—conditions which severally thus afford a strong amount of tension and support to the opened vessel. And, *secondly*, the active requisites for the entrance of air into either arteries or veins appear to be the inhaling power of these vessels, which in the case of arteries consists in the maintenance of the pulsatory and accelerating movement, which is conducive to the progress of the blood or air on which their walls react,—and in the case of veins, the inhaling or traction power of the heart, and the resilience of the lungs. Both of these conditions are produced by the dilatation of the walls of the chest consequent upon each inspiration; and as an additional influence available in determining the flow of blood or entry of air into the heart, may be added the elasticity, or a certain amount of physical *reaction*, (the *derivation of Haller*,) exerted by that organ during its diastole. *

The traction power which, to a limited extent, the heart and chest are during ordinary inspiration capable of exerting over the motion of the blood in the venous trunks, has been not only much overrated by recent authors, but has been erroneously regarded

* See Bostock's Physiology, 1828, Vol. i. pp. 412, 413.

as an active suction power, and a property of active dilatation. Admitting the existence of this power, its greatest amount during natural inspiration was found by Hales to be too limited to raise a fluid even one inch through any kind of tube, and in large animals, as the horse, to the height of six inches only. During convulsed, disturbed, or laborious breathing, however, or that performed by all the accessory agents of respiration, this power is so much increased as to be equal to that of raising a column of blood exceeding twelve inches in height. (Arnott's Physics, p. 573. London, 1833.) It is manifest that the condition of respiration now specified would operate most efficiently during severe surgical operations, or in the wounds occasionally inflicted in the throat, either with the intention of homicide or suicide; and that therefore we have a cause fully adequate to produce the entry of the large volume of air, the presence of which proves fatal in such cases as the present.

Another reason besides that which I have assigned for the vessels remaining patulous when divided, has been sought for in that morbid condition occasionally found, viz. a state of rigidity, or a preternaturally thickened state in the coats of the veins. But in a very large proportion of cases that have occurred no such condition has been found. It cannot, indeed, be denied, that when the veins are in an enlarged and indurated state, their coats when cut must be prevented from collapsing, and so evidently favour much the entry of air; but in the conclusion I have arrived at, I am supported, I find, by the authority of Berard (Archiv. Gén. de Med. Tome xxiii. p. 172.) in ascribing "the phenomena chiefly to the anatomical peculiarities of the vessels, independent of disease."

In the case before us, it would appear that, owing to the complete division of the coats of many large veins in the neck, and to the consequent intimate adhesion of their thin walls to the dense sheath of the cervical vessels, and the attachment of that sheath to the tense *deep cervical fascia*, assisted by the state of full extension of the head and limbs, these vessels were kept in a constrained and patulous state; and thus we may see, from the observations already made, how air, exclusively of blood, would pass along them into the heart with such rapidity and force, as to cause immediate death. That death is dependent in a considerable degree on *force* being in operation at the time, is proved, both from the narratives of many surgical cases on record, where the *rapid* entrance of even a small quantity of air proved immediately fatal, and from the early experiments of Harderus and others* and the more recent experiments of Nysten, † Bretton-

* Morgagni de Sed. et Caus. Morb. Epist. v. Sect. 21.

† P. H. Nysten, Rech. de Physiol. et de Chimie Pathol. Paris, 1811. Sect. 1. Art. 1. Exp. iv.



neau, Magendie, * Dupuytren, † Wing, ‡ and Dr Cormack. § From these experiments it appears, that when great *force* is used in blowing, death takes place with the greatest conceivable rapidity, and in such cases similar appearances to those found in the case before us,—particularly the appearance of a little frothy blood in the pulmonary artery,—presented themselves; while in other instances, where no great force in the introduction of a limited quantity of air was had recourse to, the animals operated on recovered.

It further appears, that, in order that the air admitted should exercise a fatal effect, it should enter *in large quantity.* ‖ It is established from the observations of Dupuytren, ¶ and of those practitioners who have been in the habit, in cases of cholera, &c. of practising the introduction of saline injections into the veins, as well as from the direct experiments of Camerarius and others, ** of Nysten, †† Magendie, ‡‡ Blundell, §§ Wing, ‖‖ Dr Cormack, ¶¶ and others, that when the quantity of air is small, it makes the round of the circulation, as appears from its being in such cases found after the lapse of a short time in every minute artery and vein throughout the body, and after a longer interval is found to have wholly disappeared, either by the process of absorption, *** or become so intimately commixed with the blood, as to be rendered incapable of causing any impediment to the circulation.

### *Symptoms.*

The symptoms which immediately supervene upon the admission of air into the blood-vessels, announce that the amount of blood circulating in the encephalon is very suddenly diminished. For, first of all, when the quantity of air admitted is small, then syncope only and the symptoms of diminished natural

* Journ. de Physiol. Expér. Tom. i. p. 191.

† Archives Gén. de Med. Tom. v. p. 436.

‡ "Boston Med. and Surg. Jour., as quoted in the Lancette Française, Mars et Mai 1835."

§ Prize Thesis, Edin. 1837, pp. 13, 25.

‖ And not to the amount of a single bubble only, which quantity, Béchat asserts, if introduced into a vein, occasions immediate death. See Recherches Physiol. sur la Vie et la Mort, Paris, 1800, pp. 268, et seq. 4th edit. by Magendie, Paris, 1822.

¶ Archiv. Gén. de Med. v. 436. Paris, 1824.

** Morgagni, Epist. v. Sect. 21.

†† Nysten, op. cit. p. 26.

‡‡ Magendie, op. cit. pp. 194, 198.

§§ Experiments on the Injection of Air into the Veins, Lond. Med. Chir. Trans. ix. 90; and Appendix to Ashwell's Treatise on Parturition. London, 1828.

‖‖ Op. jam cit.

¶¶ Op. cit. p. 26, et seq.

*** Dr Christison, in the 35th volume of this Journal, pp. 98, 99, 102, 103.

flow of blood to the head are apparent, and that too in less than a minute's time. The individual experiences faintness, and other symptoms of uneasiness; his face becomes pale, and his eyes are fixed; next, he cannot distinguish objects, his head falls back, and he loses sensibility; his breathing becomes heavy and difficult, and the movements of the chest are feeble; and he is seized with general trembling, and his whole body is covered with a cold sweat. The contractions of the heart are at first hurried; the organ beats violently and irregularly; its action next becomes feeble and fluttering, and the pulse extremely small and weak, very quick, hard, and irregular. At this crisis the unassisted powers of nature may prevail, the heart regaining strength to propel the volume of air; or by the aid of stimulants and restoratives, by bleeding and artificial respiration, employed at the proper juncture, the functions of the system may, as in ordinary syncope, be restored.

In the second place, when restorative measures are of no avail, and the heart does not recover its action, or the air is admitted into that organ in large quantity, and has entered it with rapidity and force, then, after the appearance of some or all of the symptoms of oppression now mentioned, the respiration becomes laboured and stertorous; some violent efforts at inspiration are made; the body and limbs are strongly convulsed; in a few seconds more these violent convulsions are observed to recur; and, without the loss of more blood, often attended with the loss of less, than is drawn at an ordinary venesection, death closes the scene.

## *Theory.*

In tracing the *modus operandi* of the presence of air in the veins producing the foregoing train of symptoms and effects, although I may premise that we know with certainty but little, yet we are justified in assenting to the well-founded general belief, strongly maintained by Nysten * and Magendie, † and supported by the late Sir John Leslie, that when the cavities of the heart become suddenly and violently distended with air, this organ cannot freely exercise its functions, but encounters much difficulty in contracting on such a powerful and elastic resistance. It cannot, however, be granted, that death is produced by the heart being prevented from propelling the blood which it contains, into the lungs, as Nysten argues; for both the blood and the air, we have seen, are propelled, and in cases where, from the quantity of air that has entered, a fatal result has ensued, not only has the heart been found empty, but the pulmonary vessels and the arteries of the system have at all parts contained air.

* Op. cit. p. 27. † Ibid. cit. p. 191.



In the next place, death cannot result from another alleged cause; viz. the loss of contractile power, or irritability in the heart, consequent on an over-distension of its walls, or as the result of the fatigue and exhaustion which this organ endures in its repeated powerful efforts to expel the successive large quantities of air which it receives. For although analogy shows, and dissection proves, by the pale colour which the heart exhibits, and by the coronary arteries and veins containing air only, that this agent operates most powerfully, yet this appears to be an insufficient reason in accounting for the instantaneously overpowering and often fatal effects which succeed the entrance of the air into the venous system. In proof of the correctness of this conclusion, I remark, that we are in the habit of observing, in cases similar to that of the Honourable Colonel Townsend, detailed by Dr Cheyne,* as well as in cases of resuscitation after the body of an individual has been five minutes or even three quarters of an hour under water,† and in experiments on animals, that the contractions of the heart may be with impunity suspended ‡ for a longer interval than often precedes death from the entrance of the air. An interesting and important fact ascertained by Drs Cormack and T. R. Scott,§ may likewise be adduced as proof against the common idea regarding the stoppage to the heart's action which follows the entrance of air into the veins, being occasioned by a loss of its contractile power from overaction. This is, that "in a horse about seventeen hands high, and in pretty good condition, where death occurred in three minutes from the commencement of the introduction of air into the left jugular vein, (and which introduction of air lasted one minute,) the contractions of the heart continued very forcible long after it had been cut out of the body."

But it might probably be urged with greater propriety by those who seek to realize the old maxim, "cor, primum vivens, ultimum moriens," that the complete stoppage of the sanguiferous supply to the texture of the heart along the coronary arteries, is the real cause of death, seeing that Sir A. Cooper's recent experiments go to prove that the withdrawal even for a minute and a half of the supply of blood to the *mesocephalon*, and the spinal marrow above the origin of the *phrenic* nerve, by compression of the *vertebral* and *carotid* arteries, is fatal. The notion must be allowed to be fair and reasonable, that the function of the heart may be similarly arrested, by the withdrawal, differently effected, of the sanguiferous supply to its texture. Such is indeed the effect which we may be prepared most fully to expect to follow

* See the English Malady, Lond. 1734, p. 307.

† Détail des succès de l'établissement que la Ville de Paris a faite en faveur des personnes noyées. Paris, 1773, quoted by Dr Good. See also the Reports of the Royal Humane Society.

‡ See Dr Goodwyn on "the Connexion of Life with Respiration." London, 1788, Pp. 82, 83.

§ Op. cit. pp. 10, 12.

immediately upon the stoppage of the circulation in the primary muscular fibres of this organ, arrested as that supply of blood through the coronary arteries would almost momentarily be, by the failure of the usual current of blood from the lungs and left ventricle, and by the gaseous substitute for it which would then be forced through the aortal aperture. Yet, being aware that this temporary failure of the circulation is not adequate to explain the circumstance of the rapidity of death being always in the exact ratio of the *suddenness* and *violence* with which the heart is distended with air, (as the considerations already offered respecting the suspension of the heart's action may have served to shew,) we are constrained to look more narrowly into the probable cause of death, and inquire, if, in such a case, the encephalon and spinal cord receive any supply of blood at all; and now finding that impossible, and next comparing the phenomena which supervene on the admission of air,* with those symptoms and results which characterize several anormal states, wherein a similar derivation of blood from the head occurs, we accordingly at once recognize the analogy, and may thence be led to adopt as, at least, probable, such a view of the cause of death as follows.

The cessation of the heart's action must operate injuriously, first, on the maintenance of the function in those organs which require an unceasing and unintermitted supply of blood. As the encephalon receives about one-eighth of the blood of the entire body, the prejudicial effects of a very slight want of balance in the proper amount of which, are so frequently presented to our view in the phenomenon of syncope, and as the encephalon, and that part of the spinal cord, so essential to circulation and respiration, above the origin of the phrenic nerve, are supplied with blood almost exclusively, along the vertebral and carotid arteries; it is easy to understand how these parts of the nervous system are, by the distension of their vessels with an elastic fluid, wholly deprived of their supply of blood. And if the heart's action at the same time be not maintained sufficiently long, first, to circulate all the air it contains, and then to recommence the discharge of its appropriate fluid,—a result equivalent to the complete division by the knife, of that essential part of the nervous system must follow,—namely, the instantaneous cessation of all the automatic movements of the system. †

* All the phenomena, before described, exhibit very sure proofs that the amount of blood circulating in the encephalon and higher cervical region of the spinal cord is very suddenly diminished. The violent convulsions particularly which have been observed always to precede death, imply a condition which obviously follows the sudden diminution of the supply of blood to the brain, in whatever manner that sudden diminution be effected.—See also Abercrombie on the Brain and Spinal Cord, *1828*, p. 312.

† Bichat indeed produced immediate results and *post mortem* appearances in animals similar to those arising from the accident under consideration, by propelling air upon the brain through one of the carotid arteries. (Op. cit. p. 270.) Again, cases of sudden death are mentioned by Morgagni, (Op. cit. § 19, § 24.) and other authors who have written on gaseous apoplexy, in which air was found in the vessels of the brain.



This view seems the more probable, from considering the interesting experiments already adverted to, and which I had recently the favour of witnessing Sir A. Cooper perform. In all these experiments the manual compression for the period of a minute and a-half of the vertebral and carotid arteries in rabbits was followed by death, preceded always by violent convulsions, similar exactly to those which have been observed to occur on depriving the parts of the cerebro-spinal axis, on which these vessels ramify, of their supply of blood, through means of the admission of air, either casually on the operating table, or intentionally in experiments on animals.

Finally, then, the phenomena which have been detailed, and the remarks made, afford proof, that, although the heart is the organ primarily and directly affected, the encephalon and its adjacent portion of the spinal cord, are the parts ultimately and indirectly influenced, and being arrested in their presiding functions, thus produce the fatal result.

### *Concluding Remarks.*

The foregoing case of suicide is interesting and valuable, in a variety of points of view deserving of brief notice here, both in its medico-legal bearings, and as compared with other instances of death from the entrance of air into the circulation.

1. It differs little from cases of suicide generally, in which, according to Osiander* and other writers, the weapon is always dropped from the hand before death.

2. It differs from cases of cut-throat, generally, in the circumstance, *first*, that more than one incision were made, and *secondly*, that both hands were employed for this purpose. The latter circumstance seemed more than probable, from regarding attentively the appearance of the edges of the wounds, since the peculiarity of direction and depth in an incision, made in this way, bears always a corresponding relation to the hand which has been used in inflicting it. But, if taken in connexion with two other cases on record, one detailed by Osiander,† and parallel in both particulars, just specified, to that under notice, the other narrated by Dr Gairdner‡ and corresponding to the present case in respect of several incisions having been made, we shall be guarded against forming erroneous deductions as to any other case which may present such peculiarities, not being a case of suicide.

* F. B. Osiander, über den Selbstmord, Hannover, 1813. s. 136.

† Op. et loc. cit.

‡ Case of Attempt at Suicide, in the xvi. Volume of this Journal, p. 353.

3. The preceding observation explains satisfactorily, what in the practical examination of similar cases to those adverted to, calls usually from medical practitioners for especial regard; viz. the extreme *irregularity of form* in the incisions, a condition which has been, by Sir Everard Home,* regarded as a presumption always against suicide.† For we now see how, if a body be discovered on a road or in a retired spot, under circumstances leading to the apprehension of some suspected individual, and the marks usually assumed as those of suicide be found wanting on it, while others of a quite opposite character present themselves, medical testimony may (in ignorance of the facts alluded to) give countenance and support,—and that too, far wide of the truth,—towards establishing the validity of the charge which may be presented against the individual, solely on collateral and indirect evidence. And thus farther proof is afforded of a fact which criminal law so often serves to display, how an inadequate amount of knowledge,—like an insufficient *post mortem* inspection,—may render, in the progress of a serious trial, the results of the examination of medical witnesses matter of such momentous importance.

4. The uncommon situation of the wounds in this case is explicable on the circumstance of the partial acquaintance of the individual with the anatomy of the neck.

5. The unusual amount of important parts here divided, in wounds limited superficially, but made after repeated introductions of the cutting instrument,—is perhaps worthy of remark.

6. The circumstance, that notwithstanding the very deep and extensive incisions made with the view of opening the carotid artery, the anatomical relations of that vessel are such, that it alone, of all the contents of the cervical sheath of vessels, escaped injury, is probably an unique occurrence.

7. The heart, as in M. Beauchene's case, was perfectly empty of blood, and contained air alone; other cases of death from this accident having usually presented in this organ, commixed with the air, some blood, either in a fluid,‡ or else in a frothy state. The lungs, as in Beauchene's, Dupuytren's § and a few other cases on record, were emphysematous,—a condition not ascribable apparently

* Dr Gordon Smith's For. Med. 1824, p. 305.

† I have given, (See Plate, Fig. 3.) from a subject brought this season into my Practical Anatomy Rooms, a comparative sketch of the *regularity of form* of a wound inflicted by another person, and which caused death in a few minutes. A woman plunged into the left side of the neck of her husband, in a direction downwards and forwards, between the angle of the jaw, and the anterior margin of the *sterno-mastoid* muscle, one of the pointed straight knives used for cutting leather. She thereby divided the posterior two-thirds of the internal carotid artery, the anterior part of the internal jugular vein, and the pneumogastric nerve. The incision in the skin was only three-fourths of an inch in length: its long axis lay in a transverse direction, and its edges were perfectly smooth and regular. In this case the state of the veins was not ascertained.

‡ Dupuytren, Archiv. Gén. v. 433. § Ibid.



to any degree of violence in the employment of artificial respiration in this, or probably in any case, excepting in that of M. Roux.* There was no injection of the capillaries of the stomach, or other organs; on the contrary, these were found, as already stated, paler in colour than natural.

8. The rigidity of the muscles was complete in this case one hour and a-half after death. This circumstance may probably appear worthy of mention, since, although the period of the approach of the rigidity of the body is observed to differ in different individuals, yet the opinion has been advanced by our first medical jurists, that "the rigidity of the muscles does not generally come on for some hours after death,"† and "it has been laid down as a general rule, that the more sudden the death, the longer is cadaveric stiffness from taking place, and that this rigidity occurs only after the vital heat of the body is gone."‡ But in the present instance the case was otherwise, the vital heat of the body having been evident to the senses after the commencement of the rigidity. In connexion with which fact may be mentioned, the opinion of Professor Louis, § who says, "it commences at the moment of death, even before the diminution of the natural heat;" and the evidence of Professor Traill, ‖ that he has "known rigidity begin before death takes place, and it sometimes takes place immediately, and differently in different individuals and diseases."

*Edinburgh*, 10, *Shandwick Place*,
*November* 20, 1837.

* Journ. Univ. et Hebdom. xi. 165. Paris, 1833.

† Evidence of Professor Christison in the Report of the Trial of Robert Reid for murder, published by authority, Edin. 1835, pp. 24, 26.

‡ Paris and Fonblanque's Med. Jurisp. Vol. iii. p. 24. § Lettre iv.

‖ Report of the Trial of Robert Reid, published by authority, pp. 27, 28.

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ON A REMARKABLE

# DIMINUTION OF THE MEDULLA OBLONGATA,

AND ADJACENT PORTION OF THE

# SPINAL MARROW,

CONSEQUENT UPON GRADUAL SPONTANEOUS LUXATION OF THE PROCESSUS DENTATUS, AND ANKYLOSIS AT THE UPPER PART OF THE SPINE, YET UNATTENDED BY ANY SYMPTOM OF PARALYSIS.

BY

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[WITH AN ENGRAVING.]

*(Read before the Medico-Chirurgical Society.)*

(From the Edin. Med. and Surg. Journal, No. 143.)

WILLIAM CRAIGIE, a working-cutler by trade, suffered at the age of 22 years, under a protracted attack of rheumatic fever, and was in consequence confined to bed for about seven weeks. During much of that time he was so debilitated as to be unable to turn his head or body, and lay almost constantly upon his left side. On recovery from this illness there was evident ankylosis between the occiput, atlas, and adjoining vertebræ, his head being bent immoveably forwards, and slightly to the right side. Nevertheless, he was able soon to return to his accustomed employment, and, indeed, he performed equally well the more severe and laborious operations at his forge, and the nicer and more delicate manipulations of a surgical instrument-maker, at which department of his trade he was unusually dexterous.

Four years previous to his death, he suffered under a severe bronchitic attack. After repeated invasions of this complaint, to which the severity of his occupation, with the alternations of temperature which he was frequently called upon to endure, in a great

degree exposed him, he was at length carried off, after a day of continued bodily fatigue, by a very sudden and rapid attack of asphyxia. Thus, at the age of 32 years, terminated a case of what was found, upon dissection, to be advanced vesicular bronchitis.

*Sectio.*—Upon examining the upper part of the spine, the occipital bone, as was anticipated, is found firmly ankylosed to the atlas. These two bones are immoveably united in three places.* This ankylosis serves to connect the condyloid processes, and the posterior fourth of the *foramen magnum* of the occipital bone, with the corresponding surfaces of the atlas; and the circumstance of the head of this individual being retained immoveably in a direction downwards and forwards to the right side, is explained by the circumstance of the right inferior articular surface of the atlas being dislocated downwards and forwards over the corresponding articular surface of the axis, and retained in this false position by a strong bony union.

The displacement between the atlas and axis is such that the anterior portion of the ring of the former bone projects forwards, downwards, and to the right side, from the corresponding portion of the body of the latter, to the extent of nine lines. The extremity of the right transverse process of the atlas projects seven-eighths of an inch forwards, and lies on the same horizontal plane with the extremity of the right transverse process of the axis; while the left transverse process of the atlas projects a quarter of an inch in front of the corresponding one of the axis, and is raised one inch above it. Again, the space which intervenes between the posterior surface of the odontoid process of the axis, and the anterior surface of the posterior segment of the atlas, for the lodgement of the lower part of the *medulla oblongata*, is reduced, in the mesian plane, to two lines; while to the right side of the mesian line, where, indeed, the *medulla oblongata* lay, this space does not exceed three lines and two-thirds in its antero-posterior diameter.

The synovial membrane of the atlanto-odontoid articulation is wanting, owing to the separation of these surfaces and their relative position being so much altered and deranged. However, the intervening space which has resulted from this distortion is occupied by a very strong fibro-cartilaginous band, of a cuboid shape, six lines in length by five lines in breadth. In the entire length of this dense texture, lie imbedded four vertical laminæ of bone, which at their extremities are connected to, and serve to retain immoveable, what were formerly the two opposite articular surfaces. The transverse ligament of the atlas is altogether wanting, but the tubercles which served formerly for the attachment of that ligament are connected by soft fibro-cellular tissue to the intervening fibro-cartilaginous band already noticed. The *ligamentum subflavum*, extending between the atlas and axis, is absent, excepting in the

* See Plate, where the upper surface of the atlas and axis is faithfully represented, after the occipital bone had been forcibly detached from the atlas with the cutting pliers.



mesian line, where an elongated narrow band, remarkably dense, firm, and resisting in texture, though retaining none of its original elasticity, is stretched obliquely between these two bones, in a situation where they are apart from each other to the distance of one inch and three-eighths.

The articulations intervening between the second, third, fourth, and fifth vertebræ of the neck are not very free in their movements, owing to the deposition of calcareous matter in the fibro-cartilages covering their surfaces. An approximation to ankylosis is sufficiently manifested in this condition of the parts.

The membranes and vessels of the *medulla oblongata* and cervical portion of the spinal marrow were natural.

The *medulla oblongata* itself appeared natural, with the exception of a considerable alteration in the antero-posterior diameter of its lower portion, which, from the unusually contracted limits of the spinal canal at its upper part, was reduced to only three lines in thickness. It was also remarkably altered in its position, for it rested obliquely on the basilar portion of the occipital bone, while its lower portion was placed altogether to the right side of the odontoid process of the axis and of the arch of the atlas in a circumscribed space, the antero-posterior diameter of which, as already remarked, did not exceed three lines and two-thirds, and the transverse diameter of which measured only six lines.

The nerves arising from the *medulla oblongata* were of their natural size, consistence, and colour, and so likewise were the cervical nerves.

No paralysis, or even any remote indication of the existence of that state, or of any other affection of the nervous system, presented itself in any part of the body.

The foregoing case serves to illustrate well the very considerable amount of pressure and torsion which the *medulla oblongata* and upper part of the spinal marrow may be brought gradually to sustain, without the production of the slightest inconvenience; although these important and essential parts of the nervous system, being subjected suddenly to even a moderate amount of pressure, produces an interruption, which, if maintained, may terminate speedily in a total cessation of the vital functions of the body.

Professor Rust of Vienna, who gives the best account of this morbid condition, observes, that the pressure on the spinal cord, which the luxation of the occiput upon the atlas must produce, is not fatal, because it occurs gradually.* He refers to a specimen of luxation and ankylosis at the upper part of the spine, contained in the Anatomical Museum at the Jardin des Plantes at Paris, in which the vertebral canal had been so considerably contracted that a common quill could not be introduced into the opening. The patient survived, however, long enough for ankylosis to be effected†.

* Arthrokakologie, 1817, p. 82. (quoted by Mr Lawrence.)
† Hist. Natur. Gén. et Partic. avec la description du Cabinet du Roi, Tom. iii. p. 99.

Mr Lawrence, in his very valuable paper on Dislocations of the Vertebræ,* narrates a case in many respects very similar to that which I have described. The *processus dentatus* was so completely dislocated from the atlas and occiput, as to intercept about one-third of the spinal canal, yet without producing any paralytic affection. Mr Lawrence adduces from Reil's Archives† a parallel instance, in which the vertebral canal at the *foramen magnum* was diminished by one-half, and that too without a paralytic symptom.

Caries of the atlas and axis, accompanied by gradual spontaneous dislocation of the *processus dentatus*, is, among other pathognomonic signs, characterized by the entire absence of paralysis, which, according to Professor Syme, ‡ is a very constant mark of the existence of this very interesting and important disease. The case which I have here detailed is worthy of notice, as presenting the peculiarity just noticed; while, at the same time, the history, symptoms, and necroscopic appearances of caries fail to be traced in it.

In the museum at Guy's Hospital, London, are some preparations illustrative of ankylosis and exostosis of the cervical vertebræ. But in all of these cases, as well as in many others which are recorded, paralysis had resulted. Dr Hodgkin, the author of the catalogue of that valuable collection, describes the preparations marked Nos. 1011 and 1012, as exhibiting the *processus dentatus* so much enlarged as to have occasioned paralysis. In No. 1012, a preparation taken from the body of a patient who had been under the care of Dr Bright, partial paralysis, both of the upper and lower extremities, had been produced by an exostosis arising from the *processus dentatus*.

* London Medico-Chirurgical Transactions, Vol. xiii. p. 400.
† Archiv für die Physiologie, Vol. iv. p. 407.
‡ Vol. xlv. of this Journal, pp. 8 and 9.

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# CASES OF HERNIA:

## WITH REMARKS.

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LECTURER ON OPERATIVE SURGERY.

*Extracted from the Monthly Journal of Medical Science, August 1845.*

As there are few surgical diseases in which every practitioner is so frequently called upon to act for himself, as in Hernia, and, therefore, few in which he is so immediately interested, I offer the following cases, as illustrating some of the difficulties which occur from time to time, in the treatment of this disease.

CASE 1. P. B., aged 40, the subject of the present case, had been affected with hernia for a great many years. At an early period of the complaint he had worn a truss, but for some time back had discontinued its use. Since then, the swelling had rapidly increased in bulk, but he had always been able to reduce it himself, when it became troublesome.

On the 25th of August 1840, he was attacked with vomiting and twisting pains in the belly, which, as he had been living rather freely for a few days previously, he attributed to an "attack of bile," and did not apply for medical assistance until the morning of the 27th, when the hernial swelling became painful, and on trying to reduce it as usual, he found he could not do so. He then sent for Mr Lawrie, who tried to reduce it by taxis, but without success. I saw him for the first time, at 9 P.M. of the 27th August, along with Mr Lawrie, when his state, as recorded in my notes, was as follows:—

There is a large scrotal hernia on the right side, which is tense, and painful to the touch; but the contents of which can be returned into the abdomen, with the exception of a hard rounded mass, which feels exactly like an enlarged testicle, and which cannot be reduced. The cord can be felt behind the hernia, and the testicle, of natural size, in its usual position, at the lower part of the scrotum. He has frequent vomiting and hiccup; the belly is tense, tympanitic, and tender to the touch, and he complains of severe twisting pains from the hernia towards the navel. Except a scanty stool when the vomiting first began, he has had no motion in his bowels since the commencement of the attack, although enemata and laxative medicines have been given. The expression of his countenance is anxious; skin rather warm, and covered with perspiration; pulse 108. He says that he never felt the "hard lump" in the rupture on any previous occasion.

At half-past 11 A.M., I saw him, along with Drs J. A. Robertson, J. Reid, and Duncan. The symptoms had become more urgent, and

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there was constant hiccup. Cold having been applied to the tumour, and the taxis again fairly tried, but unsuccessfully, I proceeded to operate. An incision about three inches long was made over the swelling, commencing at the situation of the deep ring, and continued downwards; the different coverings were then divided, and the sac exposed and opened, in the usual manner, to a sufficient extent to enable me to pass my finger upwards to the ring. Having divided some sharp resisting fibres at that point, I next proceeded to reduce the contents of the sac; but after reducing some convolutions of the gut, I found that the intestine seemed to be firmly fixed below; and on opening the hernial sac, a little farther down, I exposed a rounded fleshy-looking mass, evidently adherent to the scrotum by its outer surface. Its appearance was singular, resembling somewhat a portion of the large intestine twisted round the lower part of the loop of the small intestine, which had been partially reduced, and some of those present thought it was an intussusception of the bowel contained in the hernial sac. As, however, it was evident that its circumference strangulated the other portion of bowel, it was resolved to notch its edges slightly with the bistoury, at different parts, so as to try and relieve the bowel embraced by it. So tight was the constriction, that I could not introduce the probe-pointed bistoury between its edge and the intestine, and was obliged at first to divide from without inwards. When the stricture was thus relieved, the true nature of the case was at once seen, viz. that the fleshy-looking substance surrounding and strangulating the intestine, was a small subdivision of the lower part of the sac, greatly thickened, altered in structure and appearance, separated from the upper portion of the sac by a firm, narrow neck, and closely adherent to the scrotum below. The bowels were then reduced, a compress and bandage applied over the wound, and a large opiate draught directed to be given immediately.

I saw him again at 3 P.M., and found that he had had no return of the vomiting or hiccup; the bowels had not yet acted, but the enema had just been given before I called. His pulse had fallen to 96, and he expressed himself as much relieved.

At 8 P.M., his pulse had fallen to 86, and was soft; he had had one evacuation after the enema; he said he felt much better, complained of no pain on pressing the abdomen, except in the immediate neighbourhood of the wound. I directed him to take half an ounce of castor oil, to obtain a free motion from the bowels, and to have another opiate at night. I offered to send a person to watch him, but his friends stated that they had procured one of his own relations, a sick nurse, for that purpose, whom he would prefer to a stranger. I left strict orders to keep him perfectly quiet, and to let me know at once should any unfavourable symptoms appear.

I heard nothing further till next morning, when, on my way to visit him, I met a person coming for me, who said he had not been quite so well during the night; and on entering his room, to my surprise I found him moribund, and no one in the room with him.



From his landlady I then learnt that no sick nurse had ever been in attendance, and that his brother and some acquaintances had sat up with him; that they had given him, at his own request, a quantity of porridge and beer, shortly after which the vomiting had recommenced, with pain in the belly; and these symptoms had been allowed to go on without ever sending for me or Mr Lawrie.

Every effort was made to procure a *post-mortem* examination of the body, but without success.

The points principally worthy of remark in the case are, 1st, The unusual position of the seat of the stricture, viz., in the body of the sac, and towards the lower part of the scrotum, and the peculiar appearance of the lower part of the sac, as seen during the operation; 2d, Some symptoms and features of the case, which, taken in conjunction with the patient's previous history, may serve as guides in the diagnosis of similar cases, and may also lead us to modify our operative procedure in such cases.

With regard to the position of the constriction, it may be said, that, though rare, it has been noticed by several writers on hernia. Scarpa gives a plate of a hernia, with constriction of the sac in the scrotum, and points out the double swelling, as marking the nature of the case. Lawrence mentions the case of a young man on whom he operated, in whom there was a very tight stricture midway between the testis and external ring, and where he had great difficulty in distinguishing the true nature of the lower swelling, the upper part of the sac having been opened first. Pott, Wrisberg, and Pelletau, all mention having met with similar cases; but these differ from that which I have just detailed, inasmuch as they were all cases of congenital hernia, and the constriction in the middle of the sac was caused by the contraction marking the natural division of the tunica vaginalis from the general peritoneal sac. I consider this an important difference in a practical point of view, because in these cases, although the sac would be constricted in an unusual position, and therefore render the nature of the case sufficiently puzzling, still the lower part would be of the same appearance as the upper portion, they would both present the usual appearance of serous membrane, and thus the continuity of the upper and lower portions would be more readily recognised. Whereas, in the case I have described, the causes which had given rise to the constriction in the sac had also effected alteration of structure in that part of it below the stricture, and thus gave rise to greater embarrassment in the operation. What these causes were, and how they had acted in producing these effects, are, I think, obvious from the history of the case. The man, when first affected with a small inguinal hernia, had worn a truss, and continued its use for many years. The effect which this would have by its continued pressure in causing constriction of the neck of the small sac, where it lay opposite the external ring, and also in condensing and altering the structure of its whole surface generally, will, I think, be readily admitted. After a time, the use of the truss was discontinued, and the result

was, that a larger hernial protrusion took place, not entering into the original sac, owing to the narrowness of its opening at the contracted neck, but carrying along with it a fresh portion of peritoneum, and pushing the small sac down before it into the scrotum. So long as matters remained in this state, the patient could always reduce it himself; but on this one unfortunate occasion, a part of the bowel passed through the contracted part into the lower division of the sac, (or into what was the sac of the original small hernia). This was the state of parts, when the operation was performed. The upper part of the sac was opened, and part of the intestines returned, when a small tumour was brought into view closely connected with the scrotum; and now came the embarrassment, for there was no appearance of continuity between this and the superior part of the sac, owing to the tightness of the contraction; it was also totally different in appearance, and to the touch. Here, I think, it will be allowed that this was much more embarrassing than the cases of congenital hernia, where the lower part, or tunica vaginalis, unaltered in structure, would be more easily recognised, and where, from the relative position of the testicle, further assistance in diagnosis might be gained. Indeed, I confess, that the only thing which decided my action in this case, was the practical consideration, that whatever the thick fleshy substance surrounding the intestine might be, it was evidently strangulating it, and therefore equally evident, that its constricting edges must be divided to relieve the strangulation.

We now consider those points in the case, which may assist us in our diagnosis, and regulate our operative measures in similar cases. The diagnostic marks of most value, were those derived from examination of the swelling, and the feeling of it when trying to reduce it by taxis; for, although it presented at first sight the usual uniform appearance of a large scrotal hernia, yet a small "hard lump" could be felt at its lower part, distinct from the rest, and on attempting reduction, all the contents of the sac could be returned, except this "lump," which the patient, who had hitherto been in the habit of reducing the swelling himself, at once stated, he had never felt there before. Attention to these points, connecting them with the history of the case already mentioned under the former head, when speaking of the position and peculiarities of the structure on the sac, would I think lead the surgeon to discover the true character of the case, before proceeding to operate; and then the question arises, how should such knowledge modify our plan of operation? Should we cut down upon the small swelling at the lower part of the scrotum, divide the constricted part of the sac, and reduce the bowel, without interfering with the upper division of the sac at all? I do not think this would be a very judicious plan; for, in the first place, the lower part of the scrotum is not the most favourable place for incisions; and, further, we may have obstacles to the reduction of the hernia situated higher up, and if we require to divide them also, then our incision would extend through nearly the whole length of the scrotum, up to the inguinal ring, a thing always to be avoided. I should, for my own part, if I altered my mode at all, in a similar case, reduce as much as possible of the hernia, before proceeding to the operation, and this would bring the irreducible portion, or smaller division of the sac, up towards the inguinal region and upper part of the scrotum, and then the incisions might be made in the usual manner; only we must recollect that the contents of the larger or superior division of the sac having been reduced, the smaller or lower portion would necessarily become invaginated within it, so that more than one layer of serous membrane would be divided before the strangulated intestine would be exposed.



Case 2. On the 19th May 1843, I was requested by Mr Menzies to visit L——, aged 33, who was labouring under symptoms of strangulated hernia. I found the patient suffering from incessant vomiting, his countenance anxious, pulse 115, and small. There was a small but very tense oblique inguinal hernia on the right side, unyielding on pressure, and painful. The whole abdomen, also, was tender and tympanitic. He said that though for some time subject to the rupture coming down, the urgent symptoms only appeared that morning. On carefully examining the scrotum, the right testicle could be felt much atrophied, and about the size of a small flattened bean, from which the cord, also much atrophied, could be traced upwards. The left testicle, although somewhat larger, was also atrophied. On first seeing the patient, I was much struck by his boyish appearance, and thought that I must have misunderstood Mr Menzies regarding his age. He stated, that some time ago he suffered from a pain and difficulty in making water, which came on gradually, and without any assignable cause, that then the testicle first swelled to a very large size, and was very painful, and subsequently began to diminish, and so gradually wasted away. As the swelling in the scrotum diminished, the protrusion of the bowel began to appear occasionally, when in the erect position, but was always readily reduced by the hand, and as he supposed it was in some way connected with the disease of the testicle, he did not like to mention it to any one. The difficulty of making water had been very great just before the present attack; he stated also, that he had for some years been troubled with what he calls an asthmatic cough. I now attempted to reduce the hernia by taxis, but ineffectually. I then explained to him, that an operation would be required, but he wished to delay for an hour or two, till he saw some friends whom he expected.

I saw him again in the course of two hours, before which time Mr Menzies had bled him freely, and tried the taxis again in the warm bath, but without effect. As the symptoms were even more urgent than before, he now saw the necessity of submitting to an operation. This was done by the usual incision along the tumour, the skin, superficial and intercolumnar fasciæ, being divided, there appeared a large, rounded mass of fat, enveloped in a

cyst of dense cellular tissue. On dissecting through this, the hernial sac was seen and opened. It contained a portion of small intestine, very much distended; I then felt a constriction about the middle of the inguinal canal, which I divided; but on passing my finger upward, I found that there existed a very tight, firm stricture higher up, apparently in the neck of the sac. On this being divided, there escaped a large quantity of dark-coloured serum. The bowel was then reduced, the edges of the wound united by sutures, and the pad and bandage applied; and I directed him to take a large opiate draught.

Next morning I found that he had passed a good night, having had no return of the vomiting. His pulse was 90, but soft; tongue moist. He complained, however, that since the operation his cough had troubled him very much. As his bowels had not been freely opened, he was ordered an enema immediately, and to have a sinapism over the chest, and to continue the opiates combined with ipecacuan.

On the third day, I found that his bowels had been very freely opened, and he was free from any bad abdominal symptoms except pain at the wound, from constant coughing. But the cough had become much worse, and expectoration was difficult. The mucous râle was heard over both sides of the chest. The pulse was 90, but soft and compressible. Mr Menzies had been obliged to stop the use of opiates, owing to their having affected the pulse, and rendering it irregular. He was ordered to apply a large blister over the anterior and upper part of the chest and to take an expectorant mixture for the cough.

On the fourth day, the chest symptoms were somewhat alleviated. The wound was looking well. He had no tenderness at any part of the abdomen.

He continued better for some days whilst the blister remained open; but as it healed, the bronchitic symptoms again became troublesome, but yielded gradually to the use of successive blisters and stimulating expectorants. The union of the incision was, of course, interfered with by the constant cough disturbing the parts; but from the third day after the operation he did not suffer from a single abdominal symptom, and the cure was completed in about four weeks.

Case 3. M——, aged 65, affected with oblique inguinal hernia from an early period of life, but for which he had never worn a truss, felt, whilst exerting himself, a sudden increase of the protrusion, and on trying to reduce it as usual, found he could not do so. He was seen in the course of the day by Dr Burn, who, on examination, found a large and tense scrotal hernia, which he could not succeed in reducing by the taxis. I visited him, at Dr Burn's request, about 10 P.M., and found him suffering from the usual symptoms of strangulated hernia. On examination, I found a very large and tense scrotal hernia on the left side, which was so very



painful to the touch, that he could scarcely allow it to be pressed without excruciating suffering. This state probably arose from his own constant but unavailing efforts to reduce it. All the usual preliminaries having been already used, I merely applied cold over the swelling till Dr Burn arrived. I then attempted reduction by the taxis, as the cold had allayed the tenderness of the swelling. As this, however, did not prove successful, I proceeded to the operation, which presented nothing particular, except that, owing to the patient being very fat, the depth of parts was greater than usual, and that the hernia, being very large, and composed of the sigmoid flexure of the colon, required a very free division of the parts surrounding its neck before it could be returned.

As regards the immediate effects of the operation as evinced by abdominal symptoms, these were very slight. Some tenderness occurred, for which he was bled promptly by the gentleman left in charge, and opiate draughts administered. The bowels were slow in acting at first, as is not unfrequently the case where the large intestine is the part protruded; but except these, there was not a single bad abdominal symptom. This patient, however, had very nearly sunk under symptoms of bronchitis supervening on the second day after the operation. He had been for some years affected with "cough and asthma," but was quite well at the time of the operation, during the performance of which he was not exposed to cold, for it was done in bed, in a small bed-closet, and was by no means tedious. Yet, as I have said, the bronchitic symptoms appeared almost immediately after the relief of the abdominal symptoms. Rapid effusion into the bronchial tubes on both sides of the chest took place, attended with general febrile symptoms, irregular pulse, and great thirst. At first blisters and antimonial expectorants were used with relief; and subsequently, when the pulse became weak and irregular, stimulant expectorants and opiates were substituted, and also wine and beef-tea given to support his strength. Under these remedies he made a gradual but slow recovery. The wound at first healed well, but afterwards was affected by the weakened state of his health, and also apparently by the application of the blisters to the chest, for whenever these were applied, and had fairly risen, then the wound began to look pale and flabby, and union of part of it previously formed gave way, the healing process again becoming active as the blistered surface on the chest healed.

My object in noticing the two foregoing cases is to direct attention to a complication sufficiently troublesome in itself, as a concomitant of hernia, and which I cannot help thinking is more directly connected with the operation than we might at first suppose. I believe it to be the immediate result of the constitutional irritation consequent on the operation, in patients predisposed to bronchitis, which, in such patients, instead of affecting the peritoneum or intestinal canal, and thus giving rise to symptoms of abdo-

minal irritation or inflammation, produces in them these bronchitic symptoms in an aggravated form; and thus, whilst little or no abdominal uneasiness is manifested throughout, the surgeon has to contend with a series of symptoms equally dangerous, and perhaps even less controllable, than those which more usually follow the operation.

The former of these two cases is also interesting, from the circumstances preceding the protrusion. The obscure affection of the genito-urinary organs, the swelling of the cord and testicle, first distending the inguinal canal and the abdominal rings, and then the complete atrophy of these organs diminishing resistance, and thus readily permitting protrusion, are all evidently connected with the appearance of the hernia in this man.

Case 4. Mrs M——, aged about 40, was attacked on the 13th of November last, with violent pain in the bowels and incessant vomiting, which she considered as colic, but finding that the medicine she took had no effect in either relieving the pain or in procuring motion of the bowels, she sent for my friend, Mr Beath of Castle Street, who found her labouring under all the symptoms of hernia. She said she had no swelling in the groin, but on Mr Beath examining, he at once detected a considerable femoral hernia on the left side, which he tried to reduce by the taxis, but without success. The nature of her case was explained to her, and she was told that if it could not be reduced by other means, an operation would be necessary. On visiting early next morning, Mr Beath found that the vomiting had entirely ceased as well as the severe pain in the bowels, and that the patient felt easier, but the hernia felt as tense and was as considerable as ever, whilst the constipation still continued notwithstanding the use of enemata and other measures to procure evacuations; her pulse was 76 and soft; skin of moderate heat,—it was under these circumstances that I first visited the patient along with Mr Beath at 12 o'clock of the 14th.

Her state at this time was as follows:—"countenance flushed and anxious, skin hot but covered with perspiration, tongue moist, pulse 94 and rather wiry, and there is considerable thirst. The constipated state of the bowels continues, but she has had no return of the vomiting. The hernial swelling is tense and painful to the touch, but she does not complain much of pain over the abdomen, which is tympanitic and distended. I again tried the reduction by taxis, the hernia lay rather more obliquely upwards and outwards over Poupart's ligament than usual, and particular attention was had to bring it into a line with the axis of the femoral ring before attempting to return it; but the tense unyielding feel of the swelling evidently showed that its reduction could only be effected by operation. The cessation of the violent symptoms at first felt had made the patient suppose she was somewhat better, so she said she wished it delayed for a little.

At 3 P.M. I saw her along with Sir G. Ballingall and Mr Beath.



The symptoms continued much the same as at the former visit, except that the pulse was quicker and smaller. On the danger of her situation being now shown her, she consented to the operation. I therefore proceeded to perform it. The integuments having been divided by a single incision made in an oblique direction over the swelling, the sac was exposed after dissecting through the fat and glands covering it. On opening the sac, which was large, a considerable quantity of dark serum escaped, and exposed a small tense knuckle of intestine of a dark colour, very tightly constricted,—so tight indeed was the stricture that I could scarcely insinuate the nail of my forefinger between it and the intestine, so as to guide the probe-pointed bistoury. Having notched it slightly, I then passed the point of my finger a little further up, and divided the stricture fully. The bowel was then carefully examined, and although very dark and indented at the constricted part, seemed sufficiently healthy to be reduced, which was accordingly done, the wound dressed, and bandage applied in the usual manner. She was then put to bed, and a large opiate administered.

In the evening her pulse had risen, and there was slight tenderness in the abdomen, with heat of skin and thirst. For these symptoms she was promptly and freely bled by Mr B., and a pill of calomel and opium given. Next morning she had a small dose of castor oil, after which her bowels were freely opened, and after this she never had a bad symptom, and the wound healed kindly.

This case affords a good example of comparatively slight constitutional disturbance, and of remission, or rather gradual subsidence of the more prominent and violent symptoms, occurring where there is, nevertheless, a tightly constricted hernia, and shows the risk and danger of temporising in such cases, merely because the symptoms do not seem very urgent. A few hours, in all probability, would have given a very different result to the case just narrated, for I have seldom felt a tighter stricture than in this case, and the bowel was of a very dark colour even at the time of the operation. I think that in all such cases, the urgent symptoms with which the attack commenced, taken in conjunction with the obstinate constipation, and the tense and irreducible state of the hernial swelling, form a sufficient warrant to proceed to early operation, particularly where the hernia, as in the case of Mrs M——, is of recent date. I say particularly in recent herniæ, because no doubt there are cases of old irreducible hernia where our course is not quite so clear. Cases in which from irritation or inflammation of the contained intestine or omentum, or of the hernial sac itself, very urgent symptoms, closely resembling those of strangulated hernia, may arise, so very urgent, that after using other remedies without effect, the surgeon may feel himself called on to propose an operation for their relief, and yet in which these symptoms may disappear without an operation having been submitted to. As an example of this class take the following.

Case 5. *Old irreducible Hernia, with Symptoms of Strangulation. (Recovery without operation.)*—I was requested by Mr Lawrie to visit with him a female servant, in a gentleman's family, who was apparently suffering under symptoms of strangulated hernia.

I found the patient (aged about 50,) with cold clammy skin, small quick pulse, constant vomiting, and occasional hiccough. On examining the hernia, which was a large femoral one, I found it very tense and painful to the touch; the tumour felt quite fixed in its position, and the parts felt thick and matted; the whole abdomen is also distended, tympanitic, and tender. The patient states, that she has been affected with the rupture for a great many years, and that it never could be reduced, although its reduction had been frequently attempted; she also mentioned, that on a former occasion, when she had a similar attack, an operation was proposed, but that she declined submitting to it, and got better without it having been performed. On being questioned as to the commencement of the present attack, she admitted having taken some food which usually disagrees with her, having drunk a quantity of ale; she had also been exposed to sudden cold, after being engaged in cooking. "She says, the pain is of a twisting nature, stretching up from the hernia towards the stomach, and that exacerbations of pain precede the vomiting, which latter symptom is now almost incessant." Previously to my seeing her, she had been bled, enemata had been administered, calomel and opium had been given, and hot fomentations applied to the abdomen, without the slightest relief; her tongue was furred, and red at the edges. Under these circumstances, she was again bled from the arm, and leeches applied over the abdomen, near the hernia, and a large opiate draught administered, and a pill containing gr.iss. of opium, 2 grs. of calomel, directed to be given every third hour. I again saw her, in the course of three hours, and as her symptoms still continued unrelieved, or rather had increased in intensity, for there was now occasional hiccough, I explained to her master, that although, from the rupture never having been reduced at any time, there might be some doubt, still I considered her symptoms so very urgent as to warrant an operation. But as she had escaped the operation on a former occasion, she was determined not to submit to it, she said, but to take her chance again. She was, therefore, again bled, a large sinapism applied over the epigastrium, a large opiate enema administered, and the calomel and opium pills ordered to be continued. We then left her, desiring to be sent for if she should alter her resolution regarding the operation. On calling next morning, I found her greatly better; the pain had begun to subside very shortly after the opiate enema was given; her bowels, however, had not yet been opened. I ordered a dose of castor oil, which operated in a short time, and in the course of a few days she had quite recovered.

Now, the result of this and similar cases may appear to some an argument in favour of delay. At the most, it is only applicable to



cases of old standing, where the hernia has been long irreducible, in which, therefore, the impossibility of reducing it by the taxis, is of no service to us in forming our diagnosis as to whether it is strangulated or not. But if, as I presume few will deny, the contents of such herniæ be liable to strangulation, then surely, even in such cases, if along with increased tension of the tumour we find all the urgent symptoms of strangulation, I still think that, in spite of occasional exceptions, such as the case I have detailed, the surgeon will act wisely for the safety of his patient who, after using active preliminary treatment, proposes and urges the operation being performed.

To suppose that this was a case of strangulated hernia, relieved by the treatment adopted, is an idea so preposterous, that, to any one acquainted with the state of parts in such cases, it may seem ridiculous even to mention it; yet we see "Cases of Strangulated Hernia, cured by Opiates, without Operation"!! occasionally reported in medical periodicals,—cases where, as in that just detailed, the symptoms are the result of gastro-intestinal irritation, apparently commencing in the intestine contained in the hernial sac.

Case 6. *Strangulation following direct injury of the Swelling.*—An old man, who for a great length of time had been the subject of scrotal hernia, and had never worn a truss, happened to receive a severe blow (supposed to be a kick) on the swelling. He was at some distance from home when he received the injury, and though faint and sick in the first instance, he managed to walk home. He then lay down complaining of sickness, but without telling what was really the matter. Vomiting, however, began soon afterwards, and then a medical man was sent for, who, on examination, found the parts over the hernia bruised and swollen; the hernial tumour, though not very tense, could not be reduced; and he had no motion in his bowels after he received the injury. Enemata were administered, and purgatives given by the mouth, and leeches were applied over the lower part of the belly, and various fomentations to the swelling, but without affording relief.

I saw the patient at 2 A.M. of the second day from the receipt of the injury. He was then labouring under all the symptoms of strangulated hernia. The tumour was tense and irreducible, whilst the patient stated he used to be able to put it back formerly. The abdomen was distended, and painful on pressure. There was obstinate constipation, and constant vomiting; his pulse was about 108, and compressible; the skin covered with perspiration, and there was great thirst, whilst the expression of his countenance indicated great suffering. Although from the general symptoms, taken in connection with the history of the case, there could be but little doubt that there was general peritonitis, resulting from the direct injury of the hernial sac and its contents, combined with strangulation of the latter, still it appeared to me that the operation afforded the only reasonable hope of relief. I according-

ly proposed this to the patient, but he peremptorily refused to submit either to that or any other farther remedies being used; so obstinate was he, indeed, that he would not even allow the use of the warm bath, or any farther attempt to reduce the hernia by the taxis; a medical gentleman, in whose service he had formerly been, tried in vain to persuade him to submit. The vomiting increased in frequency, became stercoraceous, and, after great suffering, he expired on the third evening after the injury.

Leave was obtained from the family to examine the body.

The peritoneum was found extremely vascular, and there was great effusion of sero-purulent fluid, with flakes of coagulable lymph contained in its cavity. The vascularity was most marked, extending from the sac, and a portion of the great omentum contained in it, upwards to the parietal peritoneum, and that investing the stomach. The parts about the neck of the sac were found engorged with blood, and much swollen. The sac, generally, was of enormous thickness, (nearly three lines) and coated internally with recently effused lymph. On its external surface, in the scrotal region, there was a thin coating of extravasated blood. The parts contained in the sac, were a portion of the great omentum, behind which lay a convolution of the small intestine, much swollen, and of a dark colour; both the gut and the omentum were matted together by soft adhesions of recent lymph; the intestinal canal above the incarcerated portion was distended with liquid feces, whilst the large intestine was contracted and empty.

This case is valuable, as showing that even in cases of old herniæ, where the symptoms have, in the first instance, depended upon irritation or inflammation of the sac or its contents, strangulation of the protruded parts may be the result, and the operation may be required to afford the patient a chance of relief. For we must bear in mind, that although at the first there may be no constriction of the hernia, yet, after a time, owing to vascular engorgement, or the inflammatory swelling, such a relative disproportion may arise between the protruded parts, and the aperture through which they passed, that they cannot be returned, and then the swelling gradually increasing, strangulation of the gut is the result, which must terminate fatally, if not relieved by operation.

That such was the cause of death in the case just detailed, is, I think, obvious, both from its history and symptoms, and was confirmed, beyond a doubt, by the *post-mortem* appearances. It is true that, viewed in any light, such cases are very unfavourable, on account of the degree of peritonitis already present. Yet we must remember, that the strangulated hernia is certainly fatal, except relieved by operation, and that therefore, without this be done, we afford our patient no chance of escape. Whereas, as regards the inflammation already present, we cannot much increase that by the operation. Nay, will we not rather, by removing such a prominent source of irritation, be better able to combat the inflammatory action.

## *Case of Ligature of the Common Carotid for Hæmorrhage from Ulceration of the Face. By* James Spence, Esq., *Surgeon; one of the Teachers in the School of Anatomy, No. 1 Surgeon Square; Lecturer on Operative Surgery, &c.*

(Extracted from the Lond. and Edin. Monthly Journ. for May 1843.)

Bernard Macphee, aged 38, the subject of the present case, had been afflicted, since childhood, with a discharge from the left ear; for several years back there had been a considerable increase of pain, the discharge had become more profuse and fœtid, and about eighteen months before he applied to me for advice, pain and swelling had commenced on the left side of the face.

When I first saw him, in the commencement of March 1842, the whole of the left side of the face, over the parotid and temporal regions, and also the upper part of the neck, were greatly swollen and discoloured. The swelling was hard and tense, but deep-seated fluctuation could be distinguished over the zygoma, whilst the temporal artery was seen pulsating on the surface of the tense swelling in the temporal region. There was a thin sanious and very fœtid discharge from the external meatus of the left ear, and that opening was nearly filled up by a large fungous excrescence.

Owing to the swollen and painful state of the face, he had been for some time unable to eat any solid food. The pain at night was so excessively severe as to prevent him enjoying the slightest repose, and, consequently, his general health had suffered very much. I made a free incision into the swelling over the zygomatic region, and evacuated a considerable quantity of very fœtid pus; this afforded him considerable relief, and afterwards his general health seemed to improve; this improvement, however, was of very short duration, abscesses formed at various points in the parotid and temporal regions, and required to be opened, the zygoma could be felt bare, the discharge was exceedingly fœtid, whilst the edges of the incisions were pale, flabby, and everted. He had profuse night sweats, and occasional attacks of diarrhœa, and was evidently becoming weaker every day. In the beginning of April slight arterial bleeding occurred from one of the old incisions, but was stopped by compression; from the situation of the disease, however, I then apprehended hæmorrhage from ulceration of the branches of the internal maxillary artery, or of the superficial temporal, and desired the friends to send for me immediately, in the event of any serious hæmorrhage recurring; no further bleeding, however, occurred at this period. Shortly after this I advised him to go to the country for the benefit of his general health; and did not see him again till his return about the end of April. I then found him rather worse; he had been applying caustic to the

fungoid excrescence in the external meatus of the ear; this had caused it to take on ulcerative action, apparently of a malignant nature, which was extending rapidly; there was also considerable swelling in the submaxillary region of the neck. Owing to his obstinacy in continuing the use of caustics to the ear, and in other respects not following my directions, I ceased to attend him, and did not again see him until the morning of the 29th of May, when I was summoned in great haste to visit him, as violent bleeding had taken place from one of the old incisions in the face. I found him laid on the bed faint, and almost pulseless. The hæmorrhage, which had taken place from the incision over the zygoma, had almost entirely ceased, but he had lost, already, between two and three pounds of florid blood, and, from the weak state he was in, it seemed evident that any recurrence of the bleeding would speedily prove fatal; and as this was likely to occur when reaction took place, I considered that ligature of the carotid would be his only chance of safety. Having left the patient in charge of my friend Mr H. Reid, I called on Sir George Ballingall, and requested him to see the case, which he very kindly did at once. Sir George concurred in my opinion that ligature of the carotid artery was the patient's only chance of safety from the immediate danger of hæmorrhage; at the same time, however, it was distinctly stated, both to himself and his friends, that there was no hope of any ultimate cure of the disease of the face.

The patient having consented to submit to the operation, I performed it in presence of Sir George Ballingall, assisted by Mr Richard Mackenzie and Mr H. Reid. As the upper part of the neck was somewhat infiltrated and swollen, I made my incision so as to reach the vessel below the omo-hyoid. Owing to the want of light, and proper instruments to hold aside the edges of the incision, the operation was somewhat protracted, but I took great care to avoid disturbing the connections of the vessels on opening the sheath. It was opened immediately over the artery, and to no greater extent than a quarter of an inch; the aneurism needle was carefully passed from its external towards its tracheal side, and whenever its point was seen on the inner side of the artery, I laid hold of the ligature with the dissecting forceps, and gently withdrew the needle, so that the vessel was scarcely raised from its sheath at all; the artery was then tied, both ends of the ligature left hanging out of the wound, the edges of which were brought together by three points of interrupted suture. The patient was laid in bed with his head raised, so as to relax the neck, and a pledget of lint, dipped in cold water, applied over the wound: directions were given to the friends to keep him perfectly quiet, and to change the wet lint frequently. The operation was performed at a quarter past eleven o'clock, A.M.; at two P.M. there had been no further bleeding from the face, the pulse was 98,



and pretty full; he complained of pain in the wound on swallowing, but there was no cough, and the respiration was easy and natural. He was ordered some antimonial solution every second hour, and half an ounce of castor oil in the evening, as his bowels had been rather constipated for some days.

*May 30th.* Continued doing well; pulse 98, but soft,; skin moist. The oil had not been given, and his bowels had not been moved. He was ordered to have the oil, to continue the antimonials, the cold water dressing to the wound, and to have milk diet. On the 31st his bowels had been freely moved; the pulse was 90 and soft; the skin of natural heat; he had no cough nor uneasiness in the chest, and his tongue was pretty clean. The stitches were withdrawn, and the edges of the wound were found united, except in the immediate neighbourhood of the ligature, where there was a very slight discharge. The former treatment was directed to be continued. The swelling of the face was considerably diminished, and the discharge of more healthy appearance; and, although ulceration of the external ear continued to extend, there had been no further bleeding from the diseased parts.

The patient continued to go on favourably till the night of the 5th of June, when I was summoned to visit him, as a secondary hæmorrhage had taken place. Before I saw him the bleeding had been arrested by a gentleman placing the point of his finger on the wound; but a considerable quantity of blood had been lost previous to this having been done. I separated the recent adhesions between the edges of the wound, whilst an assistant pressed on the bleeding point with his finger. On thus exposing the bottom of the wound, the parts were found in a state evidently indicating a want of action; there was no matting of the parts together by effused lymph, as is usually the case in wounds at that period; the muscles and other tissues were pale and easily distinguished; there was no purulent deposit in the wound; the ligature had not completely separated; and the bleeding seemed to proceed from the lower part of the artery. Under these circumstances, it was deemed advisable to apply compression instead of tying the vessel nearer the heart, as it seemed probable that rapid ulceration and secondary hæmorrhage would soon follow the application of ligature to the artery. A dossil of lint was placed immediately over the bleeding point, then a graduated compress, and the whole secured by several turns of a roller brought obliquely across the neck and under the arm-pits. By these means the hæmorrhage was completely arrested. Next day his pulse was 98, and soft, and he felt easy. He was ordered milk diet, and a gentle laxative was prescribed.

On the morning of the 8th there was a slight oozing of blood, which stained the bandage; but a fresh compress was applied, and thus further hæmorrhage was prevented.

No more bleeding took place from the wound. On the 14th

of June the compresses were removed, and the edges brought together by adhesive plaster. A slight compress of lint was secured over this dressing by two additional slips of plaster, and he was ordered beef-tea and calfs'-foot jelly for diet. Under this treatment the wound continued to contract gradually, though slowly; but the ulceration of the ear progressed with fearful rapidity. The fungoid excrescence which formerly occupied the meatus had entirely disappeared; nearly one-half of the external ear had ulcerated away; the articulation of the lower jaw was laid bare; and the finger could be passed readily inwards for nearly two inches towards the base of the skull. Cerebral symptoms soon afterwards commenced; he was drowsy, raved in sleep, and gradually fell into a state of almost complete coma. On the evening of the 25th of June a profuse discharge of fœtid matter took place from the ear, and shortly afterwards this was followed by a gush of dark-coloured blood. The bleeding was arrested at the time by plugging the ear with lint. Next day, instead of being more depressed, he seemed relieved. Before, he had been quite insensible; but now, he answered questions readily, spoke rationally, and took some beef-tea and other food with relish; but this favourable change continued only for a few days, for he again gradually relapsed into a state of insensibility, and died comatose on the 4th of July.

The relations would not allow the head to be examined, and it was only with great difficulty I could obtain leave to inspect the state of the carotid. The edges of the incision were still open for about an inch in extent. The deeper parts of the wound were healed by granulations, and the divided ends of the vessel were connected by a quantity of firm lymph effused around them, whilst the par vagum and internal jugular were of their natural appearance. On laying open the artery, the internal coats were found fairly divided, and their ends retracted to some distance from each other, and adhering to the external cellular coat. There was no appearance of a clot in the vessel, either above or below the ligature, so that the lymph effused around and between the cut ends of the cellular coat seemed the only obstacle to hæmorrhage taking place. Unfortunately I was not allowed to remove the parts for further examination.

In reference to the case now detailed, there is one question connected with the after-treatment which I think worthy of consideration, viz. how far might a cautious use of nutritive diet, with a view to increase the plasticity of the blood, have been a preferable mode of treatment, to the exhibition of antimonials and the other means used to diminish the force of the circulation; as it appears to me that in this case the secondary bleeding was owing to the weakened powers of the patient being inadequate to effect the healthy changes necessary to procure obliteration of the artery.

## *Remarks on some points connected with the Ligature of Arteries.*

*By* James Spence, Esq., *Surgeon, one of the Teachers in the School of Anatomy, No.* 1 *Surgeon Square, Edinburgh, Lecturer on Operative Surgery, &c.*

(*Extracted from the Lond. and Edin. Monthly Journ. for June* 1843.)

The following remarks are the results of a series of experiments on the ligature of arteries, which induce me to believe, that whilst very great attention has been paid to the investigation of some of the causes of the obliteration after ligature, and great importance attached to certain parts of the process, there is one, which, although it must have been noticed by all, and is alluded to by some who have investigated this subject, has never received what I believe to be its due share of importance.

In attempting to establish this proposition, it will be necessary to examine what are the present opinions as to the changes essential to the obliteration of an artery after ligature, and whether these opinions are satisfactory; this I shall do as briefly as possible. The writers who hold different opinions on the subject may be divided into three classes.

*The first class* believe that permanent closure of an artery is principally effected by adhesion between the surfaces of its internal coats, but that the clot is necessary up to a certain stage of the process, viz., until, by its presence, it shall have excited such a degree of irritation as to give rise to adhesive inflammation between the opposite surfaces of the internal tunics of the vessel, to a greater extent than the presence of the ligature alone could produce; and then, having no farther need of its services, they dismiss it somewhat unceremoniously. I shall give the views of the late Mr Allan Burns in support of this doctrine, as embodying most fully the opinions held by this class.

"There is a part of the process of obliteration which must be attended to; I mean the clot of blood which is sometimes formed in the vessel. If we view this in its proper light, we shall have occasion to admire the office it performs. Bichat has shown, that naturally no absorption goes on from the inner surface of arteries. Nature has, therefore, increased her own task, by forming a bloody clot. Unless it performs a part in the process, its presence must be detrimental, since it must be removed before adhesion can take place. Where it is found, such a change must afterwards be induced, in the nature of the internal coat, as shall adapt it for removing, by absorption, the extraneous substance. The accomplishment of this also renders the aptitude for adhesion greater.

"A coagulum, as we learn from Dr Jones' experiments, is

chiefly formed where the distance from the ligature to the first lateral branch is considerable. Where the distance is short, the ligature excites a sufficient degree of irritation to produce the lymphatic effusion, but, where it is considerable, that part in the vicinity of the thread is sufficiently excited; not so the more remote part. From the natural effect of the stagnation of the blood a coagulum is formed, which, being an extraneous substance, excites the action of that part of the canal of the vessel with which it is in contact, procures its own absorption, and, at the same time, causes an effusion of organized lymph. This is really the only benefit which can be derived from the formation of a coagulum; and its presence, under these circumstances, shows that all that is required to produce obliteration is a certain degree of irritation applied to a healthy artery. If this be brought about, the adhesion will be complete."

Now, let us see how far this very plausible theory can stand the test of examination, or is consistent with known facts. *First*, as to the use assigned to the clot. Do we find that the thin coagulum effused between the surfaces of a recent incised wound accelerates or assists union by exciting adhesive inflammation? Does it not rather act as a foreign body preventing union? at least what we reckon one of the greatest improvements of modern surgery, I mean the present mode of dressing of incised wounds, is founded upon that principle. But suppose, that in the special case of arteries, such a stimulus was needed. When that purpose had been effected, how is the now useless, or rather worse than useless clot to be got rid of? By absorption. The author quoted admits that absorption does not go on from the internal coats of arteries, and even the microscopical inquiries of modern times have not been able to show the apparatus of absorption in that tissue. Mr Burns, indeed, gets over this difficulty by the assistance of an incited action, which, says he, "adapts the internal coat for removing by absorption the extraneous substance." This method of getting out of a difficulty, however, will scarcely suffice. No physiologist or pathologist has yet demonstrated that excited action forms absorbents in tissues where they do not naturally exist, and if such a mode of reasoning, or rather assertion without proof, be once admitted in practical subjects, then there will be no check to the career of the medical theorist, for, when placed in a dilemma, he has only to lay hold of incited action, or any other action, (the less understood so much the better for his purpose!) and it will furnish him with ways and means for overcoming all difficulties, and establishing his favourite doctrine.

Let us now examine the opinions of *the second class of writers;* those who believe that the coagulum is a permanent provision in the process of obliteration, and absolutely essential to prevent



secondary hæmorrhage on the separation of the ligature, that without it the adhesions between the divided internal coats would be quite insufficient to resist the impulse of the blood, and that it gradually undergoes certain changes, becomes organised, adheres to the coats of the artery, and eventually renders the vessel an impervious cord. With regard to this view I shall quote the statements of M. Manec, as being one of the most recent and indefatigable investigators of the subject under consideration, and because his opinions are the results of numerous and careful experiments, and his method of detailing the various changes he has observed are full and distinct.

"1. The means which nature adopts in permanently closing a vessel, upon which the ligature has been applied, are of two kinds:—1*st*, The adhesion of the parietes of the vessel to each other; 2*d*, The formation of a coagulum of blood, which, so soon as it is sufficiently large to fill the vessel, becomes adherent to its internal surface. . . . . 2. The means which nature, in the first instance, uses for the prevention of hæmorrhage, after the decidence of the ligature, such as adhesion of the opposite parietes of the artery, or the agglutination of the lips of the divided internal and middle tunics, when a section of these has been made, are invariably destroyed, either totally or partially, by the suppuration which takes place to detach the ligature. . . . . 3. The base of the secondary coagulum, generally in contact, and adherent more or less with the agglutination of the arterial parietes, is also almost invariably disorganised and destroyed by the same suppuration; and would thus be displaced and give rise to an immediate hæmorrhage, if it were not of a certain length, or if the union formed with the arterial parietes were not sufficiently powerful to resist the impulsion of the blood. When the ligature is applied too near a collateral branch, the formation of the coagulum is either too small or altogether prevented, and when the membranes are diseased or the vessel has been teased and too extensively insulated during the operation, the union with the arterial parietes is either destroyed altogether, or very feeble in character."

With regard to organization of the clot he says:—

"When the artery, upon which the ligature has been applied, is placed under the favourable circumstances which have been pointed out, the first effects of vital impulsion made upon the homogeneous mass of the coagulum, and the coagulable lymph by which it is united to the vessel, begin to be visible between the sixth and tenth hour after their union is completed; and are indicated by the surface of the coagulum and the substance connecting it with the internal membrane of the vessel, assuming a filamentous appearance, which soon becomes areolar. This gra-

dual change of coagulated blood into lamellated tissue, extends through the successive layers of the entire substance of the coagulum; but previously to the central portion having reached this degree of vital organization, red striæ appear in those parts which are nearest the artery. These seem to be absorbent vessels, which slowly and imperceptibly take away the colorific principle of the blood, for the purpose of throwing it into the course of the circulation; and when this substance no longer exists, the striæ lose their colour, become solid and much more resisting than before, and ultimately terminate in forming the basis of the fibrinous web, into which the sanguineous coagulum is always changed. It is probable that each filament is formed of an obliterated vessel. That I might be convinced of the vascularity of the red lines which have been described, I have frequently thrown fine injections into them, using every possible care to avoid detaching the coagulum by the mode of injecting; but I succeeded twice only in passing it from the vasa vasorum into their interior; in the other instances, the injection spread itself over the coagulum, and separated it from the artery. Should the latter circumstance not be considered to authorise the opinion which I have advanced, as to the nature of the real striæ which are found in the coagulum, it does not at least militate against it, any more than the impossibility of injecting the placental from the uterine vessels, does not overthrow the opinion which has been for some time received respecting the double exhalation and absorption which reciprocate between the uterus and placenta."

I differ from these opinions in so far as regards the clot being absolutely essential. In the case which formed the prelude to these remarks, we have an instance of the absence of a coagulum, and yet there had been no return of hæmorrhage for several weeks, and the vessel was found closed by effusion of lymph. But in experiments on animals, I have also not unfrequently found it wanting, whilst the vessel was fairly obliterated. For example, in two vessels, at the 29th day after ligature, in one there is a large coagulum, in the other there is none, yet the latter is equally obliterated. It might be said that this is merely an exception to a general rule depending upon the different circumstances of each particular case, but they are both the carotids of the same dog tied at one operation, so that we can scarcely suppose a case where the vessels could be more equally circumstanced; and that it is not a singular case, I refer to the injected preparation in the possession of Professor Thomson, in which I tied both vertebral and carotids, where the great obliteration of the one carotid in comparison with the other, is referable to a similar cause; here also both vessels were tied at one time, and I might multiply instances of this kind. When the clot is present, however, I believe that the views of M. Manec regarding its organization are correct. The statements of Hunter that he had injected coagula, and the recent and more conclusive investigations of Dalrymple,[1] favour this view, although some still doubt the possibility of this change taking place.



The third and most general opinion, held by Jones, Travers, Guthrie, and others, is, that the permanent obliteration of an artery depends entirely upon the cicatrization of the divided internal tunics, and that the clot is merely an adventitious circumstance, which, when it takes place, may assist, but is not essential to the completion of the process. With regard to this last doctrine, whilst, as I have already stated, I think it sufficiently proved that the clot is not essential, I still believe that something more than the mere adhesion of the cut internal tunics is necessary to the safe completion of the hæmostatic process, and that this has been overlooked by these investigators, chiefly because the nature of the controversy which led to their experiments directed their attention towards particular parts of the process, to the exclusion of what I conceive to be, if not an absolutely essential, at least a very uniform and important part of the process,—I mean the changes which take place on the exterior of the vessel, which, although slightly mentioned by Dr Jones and others, never seemed to have engaged their attention as conducing to the obliteration of the vessel.

If we examine an artery which has been tied, forty-eight hours after the operation, we find it surrounded for a considerable distance above and below the ligature by a deposition of pretty firm lymph, which presses upon and adheres to the coats of the vessel, completely imbedding the ligature, which is deeply sunk between the ends of the artery. At this period the adhesions of the lymph to the arterial parietes, though distinct, are comparatively slight. When examined ninety-six hours after ligature, the effused lymph, though diminished in bulk, has become much firmer, and is, as it were, concentrated round the vessel; and when the external portion is dissected off, we see distinct filamentous bands passing from one end of the vessel to the other around its entire circumference. If examined at the 9th day after the operation, that is, when the ligature is separating, we find that the thread is enveloped in a tubular sheath of lymph, that the deposit round the vessel itself is now very dense and firm, and if the ligature be partially separated, we find that the effusion of lymph has kept pace with its separation, and united the ends of the vessel at the point whence the ligature has separated, immediately behind the thread. On the 13th day, that is, when the ligature has fairly

[1] Transactions of the London Medico-Chirurgical Society, vol. xxiii.

come away,[1] the lymph has assumed the appearance of a firm connecting medium uniting the divided ends of the vessel, not unlike the exuberant callus in a fracture: at the 28th day in some, but later in other cases it has become much absorbed, so that the vessel has now the appearance of a firm impervious cord at that part where the effused lymph formerly existed.

From a consideration of these facts, I am induced to believe that the lymph effused around the artery, is of great importance in assisting the internal changes in the process of obliteration. First, and most obviously, by uniting the divided ends of the vessel, and thus supporting the adhesion of the internal coats at the period of separation of the ligature, for, at that period, a sort of double action seems to go on,—the ligature ulcerating its way out, whilst, at the same time, the reparative process of effusion of lymph keeps pace with the ulceration,—a process in fact analogous to the old operation for fistula, with the gradually tightened wire, the reparative process literally following step by step in the track of the ulceration. There is also another very important, though at first sight less obvious effect which the effused lymph will produce from its very first deposition, viz., by its pressure it will diminish the calibre of the vessel, and thereby lessen the impulse of the blood in the neighbourhood of the ligature.

As to the views I have taken regarding the absorption or organization of the clot, they merely have reference to the present state of our knowledge on these points. I am inclined to believe in its organization, because direct proof has been given that coagula have been shown to become organized. As to absorption of the clot, though I do not mean to say that it cannot take place, we have as yet no proof adduced as to the manner in which such a change could be effected from the internal coats of arteries. There is, however, much to be done in investigating these points, and I believe that the zeal with which microscopal inquiry is now pursued, will be the means of furnishing us with a more accurate and distinct knowledge of the changes which take place both in these and other experiments.

[1] The dates here mentioned, are those at which I examined the vessels which form the series of preparations illustrative of the facts above recorded, and deposited in the Anatomical Museum of the University of Edinburgh.

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# PRIZE ESSAY.

# AN ESSAY

ON THE

# ACTION AND CURATIVE PROPERTIES

OF

# STRYCHNIA,

TO WHICH THE

ANNUAL MEDAL OF THE HARVEIAN MEDICAL SOCIETY

WAS AWARDED IN 1832.

BY JAMES MARR, M.D.

OPINIONUM COMMENTA DELET DIES NATURÆ JUDICIA CONFIRMAT.—CICERO.

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ON THE

# ACTION AND CURATIVE PROPERTIES OF STRYCHNIA.

## SECTION I.

### OF THE PLANTS WHICH FURNISH STRYCHNIA.

Strychnia, a peculiar vegetable alkali, was discovered by Pelletier and Caventou in 1818. The plants which furnish this substance form a genus called Strychnos, belonging in the Linnæan arrangement to the Class *Pentandria*, Order *Monogynia*, in natural arrangements to the Luridæ, (Linnæus,) the Apocyneæ, (Jussieu.) Several species of the Strychnos have been examined, viz., Strychnos Nux Vomica, S. Sancti Ignatii, S. Colubrina, S. Tieute, S. Potatorum, and S. Pseudo-kina, all of which, with the exception of the two last, contain the substance in question.

## SECTION II.

### BOTANICAL, PHYSIOLOGICAL, AND THERAPEUTIC HISTORY OF NUX VOMICA.

A short account of the first, S. Nux Vomica, only will be required in this paper. It is a native of Cochin-China, and

is called Cay-cu-chi, also of Persia, (*Flora Cochin-China*, vol. i. p. 125.) It is found in many parts of the East Indies, in Ceylon, Malabar, and on the Coromandel Coast, (*Moon's Catalogue of Ceylon Plants*, p. 16.) "It is of a middling size, with a rather crooked, but thickish trunk and irregular branches; the leaves are opposite, on short petioles, ovate, shining, smooth on both sides, entire, three—five nerved, about four inches long, and from an inch to three inches broad; the flowers are small greenish-white, and collected in small terminating umbels," (*Ainslie's Mater. Med. Indica*, vol. i. p. 319,) having rather a disagreeable smell; the calyx is five—cleft and deciduous, the corolla monopetalous, and also five—cleft. The fruit is about the size of a small apple, covered with a smooth, somewhat hard shell, of a beautiful orange colour when ripe, and is filled with a soft, jelly-like, bitter, poisonous pulp, (*Op. cit.* vol. i. p. 318.) In this pulp are generally found seeds varying in number from three to five; these constitute the nux vomica of the Pharmacopœias; they are flat and round, about three-fourths of an inch in diameter, and covered with silky hairs; they are of an intensely bitter taste, and an odour like powdered liquorice, (*Christison on Poisons, first edition*, p. 638.) One of the seeds may weigh about 20 grains. In India, the seeds having been finely powdered, and intimately mixed with Margosa oil, are given in very minute doses for various diseases, (*Ainslie, Op. cit.* vol. i. p. 318.) They are also considered, in many parts of India, as a certain antidote to the bites of venomous serpents. Dr Fleming says that the natives of Upper Hindostan are in the habit of adding the seeds in the process of making arrack, in order to render the spirit more intoxicating.

From a statement in the Lancet, according to parliamentary returns, there appears to be imported into this country no less than 30,000 pounds of nux vomica, on an average, annually, (*Lancet*, 1829-30, p. 478.) If this statement be true, it certainly becomes a very important question in what manner all this substance is consumed.

Nux vomica produces very powerful effects on the animal



economy; even in very small doses it has proved fatal. Hoffmann mentions a case where two fifteen grain doses of the powder produced death; and, in Hufeland's Journal, there is a case where two drachms were attended with the same result in two hours, (*Christison Op. cit.*, p. 538.) For this reason practitioners have always been careful in administering it as a remedy; indeed, it was almost entirely laid aside till modern physiologists called the attention of the profession to the marked effects produced by administering it to the lower animals. These vary in different animals; according to Magendie and Delille, half a drachm of the powder killed a dog in forty minutes, and one and a half grain of the alcoholic extract, thrust into a wound, killed another in seven minutes; whereas Loss states that hogs may eat a large quantity with impunity; and Despartes gave very large doses to a goat* without producing any visible effect, (*Ainslie, Mat. Med. Ind.*, p. 320.)

Its deleterious property is manifested more quickly when injected into a vein, or a serous cavity, as the pleura or peritoneum, than when applied to any of the mucous surfaces of the body.

The following is the conclusion which Magendie came to, concerning the action of this substance on the living frame, viz., that it exerts an especial action on the spinal marrow, and nerves emanating therefrom, as well as on the muscles which these nerves supply.

Soon after this fact was made known, Fouquier was induced to try the nux vomica in paralytic affections, and published several cases where the exhibition of this remedy was attended with complete success. Magendie also published evidences of its efficacy in such cases.

Bayle has collected a numerous set of cases from different authors where nux vomica was used, with much success, in epilepsy, dysentery, &c.

* Goats seem to possess a very peculiar idiosyncracy with regard to the action of poisons. I have seen a goat repeatedly swallow from half an ounce to an ounce of snuff without any apparent injury.

Still, however, from the violent nature of the substance, and the variation of its effects according to peculiarities in the preparation, &c., the great majority of the profession laid it aside as a dangerous and equivocal remedy.

## SECTION III.

### CHEMICAL HISTORY OF STRYCHNIA.

In 1818, as was already stated, Pelletier and Caventou discovered that the active properties of the genus Strychnos depended on the presence of a vegetable alkali, to which they gave the name of strychnia.

Dr Turner, in his Elements of Chemistry, recommends the following process of M. Corioll, as the best for preparing it: "A quantity of nux vomica is to be treated with successive portions of cold water, evaporating the solution to the consistence of a syrup, and precipitating the gum which is present by alcohol. The alcoholic solution is then evaporated to the consistence of an extract by the heat of a water bath. The extract, which consists almost entirely of the igosurate of strychnia, is dissolved by cold water, and, by this means, deprived of a little fatty matter which had originally been dissolved, probably through the medium of the gum. The solution is next heated, and the strychnia precipitated by a slight excess of lime-water, and then dissolved by boiling alcohol. On evaporating the spirit, the alkali is obtained pure, except in containing a little brucea,* and colouring matter, both of which are effectually removed by maceration in dilute alcohol. (*Turner's Chemistry*, p. 651; *Journal de Pharm.* Oct. 1825, p. 492.)

Strychnia, when pure, crystallizes in the form of octohedrons. It has a most intensely bitter taste, which is perceptible, it is said, when a grain is dissolved in 80 lbs. of water. (*Ann. de Chim. et de Physiq.* vol. x. p. 153.) It is very sparingly soluble in water, but easily soluble in alcohol and in the volatile oils. Its alcoholic solution has an alkaline reaction. It forms neutral salts with acids. Pure strychnia is not turned *red* by the reaction of nitric acid. (*Pelletier, Caventou, Ann. de Chim. et de Physiq.* xxxi. p. 56.) According to the analysis of Pelletier and Caventou, strychnia is composed of 78·22 of carbon, 6·38 of oxygen, 6·54 of hydrogen, and 8·92 of nitrogen.

* Brucea is another vegetable alkali found in the Strychnos; it resembles strychnia very closely, only it is about twelve times less energetic.



## SECTION IV.

### PHYSIOLOGICAL ACTION.

Strychnia appears to possess the active properties of the nux vomica in a very concentrated state; with the exception of hydrocyanic acid, there is no poison endowed with such destructive energy. Dr Christison has killed a dog in two minutes, by injecting one-sixth of a grain into the chest, in the form of alcoholic solution; and he has seen a wild boar killed in the same manner with the third of a grain in ten minutes. The symptoms produced are very striking and uniform. "The animal trembles, and is then seized with a stiffness and starting of the limbs. These symptoms increase, till at length it is seized with a fit of violent general spasm, in which the head is bent back, the spine stiffened, the limbs extended and rigid, and the respiration checked by fixing the chest. The fit is then succeeded by an interval of calm, during which, the senses are quite entire. But another paroxysm soon sets in, and then another and another, till at length a fit takes place more violent than any before, and the animal perishes suffocated," (*Christison Op. cit.* p. 637.) The accuracy of this description I had an opportunity of verifying on many animals which were destroyed by this substance. The first

symptoms appear in sixty or ninety seconds when the poison is applied to a wound. When it is injected into the pleura, Pelletier and Caventou have seen them begin in fifteen seconds. M. Bouillaud has recently found that strychnia has no effect when applied directly to the nerves, (*Christison, Op. cit.*) When we touch an animal labouring under the effects of strychnia, a sudden start like that produced by an electric shock pervades its whole system. I saw this well marked in some of the cholera patients who were treated by strychnia at the Drummond Street Hospital. I may mention, that I have observed exactly the same starting in a child of two years old, who was labouring under the effects of a very extensive scald by boiling water.

The morbid appearances observed in animals poisoned by strychnia vary according to the period at which death takes place. Dr A. T. Thomson, in a paper read to the College of Physicians, London, gives an excellent account of these appearances. I shall relate his two cases at length, (*Lond. Med. Gaz.* vol. viii. p. 50.)

"I. A quarter of a grain of strychnia was placed on the tongue of a small spaniel. The animal was not much affected for ten minutes; when the dose was repeated, the usual symptoms attendant on poisoning by strychnia now manifested themselves, and the animal expired in ten minutes after the exhibition of the last dose of the drug. In ten minutes afterwards, the body was examined, and presented the following appearances: No indication was perceptible of any change having taken place in the circulation of the encephalon or spinal cord: the brachial artery of the left side was opened, and discharged dark blood: the lungs readily collapsed; they were not gorged with blood, but had minute petechial spots beneath the pleura. The heart was much distended, and could not be excited by pinching it. The distention was chiefly in the ventricles: the blood on the left side was not florid; the aorta was very much contracted. No apparent effect was produced, when the phrenic nerve was irritated longitudinally, but contractions were excited in a few fibres of the diaphragm, when the knife was drawn across it. The stomach was empty and contracted: the mucous surface throughout was pink, and without injection of vessels. The lining membrane of the other parts of the alimentary canal was white. The vessels of the outer covering of the kidneys were turgid with blood. The urinary bladder was empty and contracted: the gall-bladder was full and tense."



"II. Two grains of strychnia were given to a strong poodle; death took place as in the former case, just twenty minutes after the poison had been taken. The body was opened in four minutes after death; the lungs collapsed readily, were of the natural colour, and did not exhibit the petechial effusion under the pleura noticed in the former case. The heart was enormously distended, and could not be excited by any stimulus; the aorta was very much contracted, not exceeding a crow quill in size: the phrenic nerve had not lost its excitability; being rubbed transversely, short and rapidly repeated contractions of the diaphragm took place: and the effect was still stronger, when the nerve was rubbed longitudinally. In the abdomen, all the veins were unusually loaded with blood, while the arteries were correspondingly diminished. No change was observed in the circulation of the head or spine."

These experiments I repeated both on dogs and rabbits. The morbid appearances I found to vary considerably. In one set of cases, where death was produced almost instantaneously, by injecting a large dose of the poison into the cavity of the peritoneum or pleura, few or no morbid alterations could be detected. While in another set of cases, where death was slower, but took place within a few minutes after the exhibition of the strychnia, very marked general congestion was observed, the venous system in many instances appearing as if distended by artificial injection, while the arterial system was correspondingly emptied, and even appeared contracted on itself. The lungs commonly were slightly congested, but collapsed readily

enough. The heart was always found loaded with blood, particularly on the right side. The appearances of the mucous membrane of the alimentary canal varied considerably, even when animals had been destroyed by as nearly as possible the same quantity of the poison; sometimes it seemed natural, at other times bore marks of great congestion, particularly that portion lining the stomach and upper portion of the small intestines. The stomach and urinary bladder generally were found contracted, particularly the latter organ, and of course never contained any urine. The brain and spinal cord presented an equal variety of appearance, varying from slight congestion to effusion of serum; the latter, however, was only observed in two cases where death had been unusually slow. In none of these dissections could I observe, as has been alleged, that strychnia exerts any particular action over the cerebellum, nor did I observe that loss of irritability of the heart which Segalas and others say generally takes place; on the contrary, it appeared that the organ retained its irritability just as long as in other cases where sudden death had been produced, and was equally capable of being roused by artificial respiration.

From these and many other similar experiments, it would appear that no particular morbid change except venous congestion is to be found in animals destroyed by strychnia, and that death in these cases usually takes place by asphyxia, produced by the prolonged universal spasm of the respiratory muscles. In other cases, however, where the animal is destroyed instantaneously, death takes place, by what W. Philip calls nervous apoplexy, by which I understand idiopathic apoplexy, or, as some explain it, the capillaries of the encephalon and medulla oblongata are so constricted that their function is completely suspended, and life consequently instantly becomes extinct, the same as from shocks of lightning, &c.

These experiments also show that there is a very close resemblance between the action of strychnia and nux vomica, the former, in fact, having all the properties of the latter, but only in a more concentrated form.

Accordingly, therefore, we have no hesitation in coming to



the same conclusion concerning strychnia as Magendie did regarding the nux vomica, that it exerts a special action on the medulla oblongata, spinal marrow, and nerves emanating therefrom, as well as the muscles which these nerves supply; but it seems to have little direct influence over the brain.

In the human subject, the physiological action of this drug is the same as on the lower animals. In small doses it produces slight twitchings of the limbs, starting, particularly during sleep, increase of perspiration, frequent inclination to void urine, and acceleration of the pulse. In larger doses the twitchings amount to convulsive startings, and in some cases regular tetanic spasms have agitated the whole frame, much to the terror, both of the patient and the bystanders.

According to Fouquier, constipation follows the use of strychnia, while Professor Christison, I think, states that it more usually causes diarrhœa. For my own part, I agree with the former.

## SECTION V.

### CURATIVE PROPERTIES OF STRYCHNIA.

The investigation of the powers of a medicine, as a remedial agent, is, perhaps, one of the most perplexing of all medical enquiries. In none do we meet more difficulty in "tracing *effects* to their true *causes*, or in ascribing to *causes* their true effects;" and, consequently, in none do we find vague hypotheses so much to abound.

But, more than this, we too often find individuals giving as the result of observation not what *really* takes place, but what, from preconceived notions, they think ought to take place.

Scarcely a new remedy has ever appeared, but some medical men have come forward and ascribed almost miraculous powers to it, while others, justly disappointed by the exaggerated views which have been put forward, go to the opposite extreme, and deny any virtues to the remedy at all. Strych-

nia is much in this state at present, one set of authors contending, that almost every variety of palsy, and many other diseases, may be cured by it; while others maintain, that it is not only totally inefficacious, but highly dangerous.

In considering this subject, I shall endeavour to divest myself, as much as possible, of all prejudice, and as far as my limited means will permit, to state fairly the actual properties, whatever they may be, of this remedy, and from them carefully to deduce what are its claims to be ranked among our remedial agents.

The diseases in which strychnia has been chiefly employed are Amenorrhœa, Chronic Diarrhœa, Cholera, Amaurosis, and Palsy. A consideration of its efficacy in each of these diseases we shall now give, in the order in which they have been enumerated.

I. *Amenorrhœa.*—We are indebted to Dr Bardsley for introducing strychnia as a remedy in this disease. He has collected twelve cases, ten of which were cured, and two were relieved by it. The cases were *amenorrhœa suppressionis.*

Six cases have occurred to me where this remedy was employed. In two, after using it for about a fortnight, the catamenia returned. In three others, although persevered in for some time, no benefit was derived; and, in the remaining one, twitchings took place, which so frightened the patient, that she could not be persuaded to go on with the drug. The action of the strychnia, in these cases, Dr Bardsley considers to be by stimulating the uterine vessels, and improving the tone of the general system.

The dose varied from the $\frac{1}{8}$th to $\frac{1}{4}$th of a grain three times a-day.

For my own part, I am not very sanguine as to the efficacy of strychnia in amenorrhœa, though, I believe, in some forms of the disease, particularly those where tonics or electricity are indicated, it may be given with advantage. But I should scarcely recommend its use until the more ordinary and simple means had been tried and had failed.



II. *Chronic Diarrhœa.*—Dr Bardsley, in his Hospital Facts, details six cases which were treated successfully by *strychnia alone.* Dr Balfour, in an elaborate and highly talented inaugural dissertation on Strychnia, relates three cases where a similar result was observed.

The following cases have come under my own notice at the Royal Public Dispensary here:—

1. Thomas Johnston, a porter, æt. 54, emaciated and of bad constitution, became a patient under Dr Moncrieff, September 4, 1831. Has suffered from diarrhœa occasionally, sometimes very severely, for several years; ascribes the origin of his complaint to a residence while a soldier in the East Indies. Catechu, kino, the acetate of lead, and the usual remedies, were ordered with some benefit. On the 12th, he returned, stating himself to be as bad as ever. The sixth of a grain of strychnia, in the form of pill, was then ordered, three times a day; it was then gradually increased to the fourth of a grain, after which a marked improvement took place. At the end of three weeks he was quite well, and declared himself better than he had been for many months before.

2. —— Lightbody, 10th May 1832, æt. 32, residing in Mary King's Close, has all the marks of confirmed phthisis. Has been treated in the usual way by leeches, counter-irritation, &c. A short time ago, bowel complaint came on, for which acetate of lead and opium, chalk, catechu mixture, &c. were ordered, with great relief, but ultimately they all lost their effect. From the state of the tongue, stools, &c., it was suspected that ulceration of the bowels had taken place. The strychnia was then exhibited in doses of $\frac{1}{8}$th of a grain, three times a-day. This, with an occasional opiate at bed-time, gave great relief, *checking the diarrhœa,* and acting as a general tonic. He continued the alkali for some time, giving it up when the diarrhœa left him, and resuming it on the recurrence of the disease. This poor man, as was to be expected, gradually sank under the affection of the lungs.

3. Sarah Baxter, August 4, 1832, æt. 50, residing in Lawn-Market, has been suffering from bowel complaint for nearly

six months; has taken various remedies with relief; but the disease has always returned. Formerly she had a severe attack, when she voided blood, but has not observed any during her present illness. She has usually five or six loose stools daily, almost always after eating, the stools are very offensive, liquid, and contain portions of undigested food. Particular attention was enjoined regarding diet, and strychnia to the extent of $\frac{1}{8}$th of a grain, three times a-day, was ordered. In the course of a week the evacuations were lessened, and by the end of a month, without the use of any other remedy, she was entirely cured.

These cases have been selected from several others of a like character, where a cure has been effected, or relief obtained, from the administration of strychnia; but I think they are sufficient to warrant the conclusion, that, in chronic diarrhœa, strychnia is a useful and often a very serviceable medicine. Its use, however, ought to be limited to those cases which not unfrequently occur, and which baffle the usual treatment by sedatives, astringents, &c., and which seem to be owing rather to relaxation than irritation of the mucous membrane of the intestines. If any symptoms of inflammation of the membrane exist, the use of strychnia is decidedly contra-indicated. I believe the administration of strychnia, in the diarrhœa which accompanies phthisis, has never been tried before; but from what I saw in the case of Lightbody and four others where I used it, I am sure that it is a safe remedy, and one capable of affording considerable relief.

III. *Cholera.*—Of all the diseases to which the human frame is liable, perhaps there is none in which so many remedies have been tried, and so many have failed, as cholera; having, therefore, nothing on which we can place any reliance, we are, in my opinion, justified in giving a trial to any remedy which, from reason or analogy, we consider might be useful. Accordingly, strychnia has been given, 1st, from a supposed analogy betwixt cholera and diarrhœa; and, 2dly, from the property strychnia is known to possess, of powerfully stimulating the nervous system, which, or a portion of which, is



supposed by many to be very much depressed in this disease.

The following cases, which, through the kindness of Dr Mackintosh, I saw treated at the Drummond Street Hospital, may be regarded as giving a very fair and extensive view of the use of strychnia in this dire disorder:—

Case I.—*October* 17, 1832.—Catherine Mackenzie, æt. 64, a widow, of general good health, but rather intemperate habits, was seized with diarrhœa two days ago, which has continued ever since. Vomiting came on this morning. Admitted at 9 P. M.

Universal coldness of surface. Pulse 92, weak, tongue dry and warm. Features rather contracted, expression anxious; has some pain of epigastrium.

Has had one characteristic stool since admission; says she voided urine at the same time. She complains also of great thirst, of giddiness, and pain of head.

To be placed on the steam-bed.

St. Strychniæ, gr. $\frac{1}{4}$ omni hora.

To have some whisky toddy occasionally.

18*th*, 10 A. M. The strychnia was stopped about four o'clock this morning, from nervous twitchings and startings having manifested themselves. Pulse 70, small and weak; skin warm, tongue dry; thirst continues severe; face flushed; has had numerous scanty characteristic motions during the night; no urine; great tenesmus; slight headache.

Omit Strychnia. Continue toddy.

2 P. M. Face flushed; pulse 90, of tolerable strength; has had neither purging nor vomiting for the last two hours; tongue dry and parched; complains much of thirst.

10 P. M. Pulse indistinct; has become quite comatose, and can scarcely be roused; breathing stertorous; a blister was applied to the nape of her neck; cold to the head; sinapisms to the legs; but the woman died on the morning of the 20th at four A. M.

Case II.—*October* 19, 1832.—Johanna Sinclair, æt. 36, resides in Leith Wynd, health and habits reported good; was attacked three days ago with purging, which has continued ever since. Vomiting came on this afternoon about five o'clock. *Admitted* 11 P. M. Pulse small and weak; not countable; universal coldness of surface; tongue white and cold; countenance collapsed, eyes sunk, and surrounded with dark areola; lividity of lips and hands; fingers shrivelled; has had considerable characteristic vomiting since admission; says she is advanced six months in pregnancy.

Steam-bed—whisky toddy.

St. Pil. Strych. gr. ¼ omni hora.

*20th*, Ten A. M. Has taken seven of the strychnia pills, when, startings having come on, they were stopped. Pulse 120, of tolerable strength; skin warm, tongue moist, rather foul; thirst considerable; has had one scanty evacuation, but passed no urine since admission; appears to be very drowsy.

Abscind. capillæ; cold applications to be applied to her head.

The drowsiness, in this case, went on as usual to coma in spite of various remedies, and she died early on the morning of the 21st.

*Sectio cadaveris.*—Surface of brain highly injected; dark fluid blood in longitudinal and lateral sinuses. Heart, ecchymotic spots on surface; fibrinous clots in right auricle, ventricle, and pulmonary artery, and vena cava descendens; lungs much engorged; bronchi contained dark frothy mucus; kidneys contained a small quantity of puriform fluid in the pelvis of each.

Case III.—*October* 21*st*.—Francis Muir, æt. 58, a hairdresser. Wife died of cholera, son at present ill of it in Hospital. Previous health and habits reported good. Was seized with purging this afternoon about four o'clock. Has had no vomitings or cramps.

Admitted at six P.M. Pulse 67, full; tongue warm, moist, and whitish; slight thirst; surface natural; voice slightly affected;



has had several stools of characteristic appearance; urine suppressed.

Habeat suppositor.; ex Opii, gr. iv.

St. Strychniæ, gr. ¼, omni secunda hora.

Ginger beer for drink.

*Oct.* 22*d*. The pulse having become nearly imperceptible, and other symptoms of collapse having manifested themselves, eight lbs. of the saline fluid were injected into the basilic vein, which was attended with the usual good effect,* followed by a long continued rigor. Since last report, previous to injection, has had severe purging of characteristic appearance; slight vomiting, with occasionally severe cramps of inferior extremities. Strychnia has been taken regularly.

Cont. Strychnia.—Rep. Suppositor.

10 A.M. Pulse 130, rather sharp; tongue moist, but foul; surface warm; purging of characteristic appearance; slight drowsiness, but is easily roused. Omit strychnia.

This man got gradually worse, and died at half-past eight on the morning of the 23d.

SECTIO CADAVERIS.

*Brain.*—Fluid blood in sinuses; vascular externally; a few ecchymotic spots on right hemisphere; numerous bloody points on making sections; slight effusion into lateral ventricles.

*Lungs.*—Extensive adhesion of left, great enlargement of both; bronchi contained dark frothy mucus; large fibrinous clot in right auricle and ventricle, extending into the pulmonary artery, even to its minute ramifications.

*Liver* mottled. Gall-bladder distended, with dark grumous bile.

*Stomach.*—Considerable vascularity near cardiac orifice; mucous membrane thickened and softened; mucous membrane of jegunum minutely injected in some places.

*Colon.*—Several ecchymotic spots on mucous coat. Urine in the bladder.

* By the usual good effect is meant, reaction taking place, the pulse becoming stronger, &c.

Case IV.—*October 20th.*—John Muir, æt. 19, a hairdresser from Catherine Street, son of the last patient. Health and habits reported good. Was seized this morning with purging about six o'clock, but has had no vomiting. Cramps came on at 10 A.M.

*Admitted at 12 noon.*—Pulse 120, of tolerable strength; tongue cold, white, and moist; heat of surface moderate; characteristic purging still continuing, with severe cramps; no vomiting; great thirst. Says that he has passed a good deal of urine to-day. App. sinap. crur.

St. Strychnia gr. ¼, quaque secunda hora.

Habeat suppositor, ex opii gr. iv.

8 P.M.—The pulse having increased in strength, and become sharp, with complaints of giddiness, he was bled to the extent of ten ounces, which reduced the pulse, and relieved the giddiness. At present his pulse is 120, and again sharpish; tongue white and moist; great thirst; very little urine voided; expresses himself much easier. Has taken his strychnia regularly. The whole quantity given is gr. i. ss.

Omit strychina.

Ap. cucurbic. cruent. nuchæ et fluat sanguis ad ℥ vii.

Habeat suppos. ex opii g. iv.

This man remained in a feverish state for a day or two, but made a rapid recovery.

Besides these, I have seen a vast number of cases of this disease treated by strychnia; but the foregoing cases throw just as much light on the effects of this remedy as the whole would do. As far as my observation goes, and I have alluded to those cases both impartially and attentively, I would say that strychnia, in the *majority* of the cases, even when administered in the doses I have mentioned, produces no appreciable effect; in short, that it is of no use in cholera.

I, however, consider it my duty to state, that I never saw a case of cholera, where the patient appeared to receive any injury by its use.

A most remarkable fact, observed in those cases, is the



quantity of strychnia which can be given without producing its usual effects on the system. In all the cases I have alluded to, it was given in combination with the muriate of morphia. I do not know exactly the proportion, but I am quite sure it was very small. Now Pelletier and Caventou recommend muriate of morphia as an antidote to strychnia, but, whether it is from the presence of this substance, or from the nature of the disease, that such doses of strychnia can be borne, I have not been able to determine.

IV. *Amaurosis.*—Dr Shortt, whose skill as a practical physician is well known, has the honour of being the first who used strychnia as a remedy for amaurosis. Since the publication of his Cases in 1830, it has been pretty extensively used; Dr Fife of Newcastle-upon-Tyne, Mr Middlemore of Birmingham, Mr Guthrie, and some others, have published cases confirming those given by Dr Shortt. I have also seen it used a good deal by Mr Liston.

In this paper I shall refer chiefly to Dr Shortt's cases, because, as a pupil of the Edinburgh Infirmary, I had the advantage of personally witnessing Dr Shortt's judicious treatment with this remedy.

Amaurosis being a term that is applied to various morbid conditions of the organ of vision, it becomes necessary to specify in particular those in which strychnia has been used, those in which it may be useful, and those in which its use is contra-indicated.

The cases in which it has been tried and found useful are those where the amaurosis depends on paralysis of the optic nerve and retina, or where it arises from congestion causing pressure on these parts, with a loaded and inactive state of the minute vessels of the neurilematic sheath. (*Dr Shortt, Ed. Med. and Surg. Jour.* vol. xxxiv. 416.) Dr Shortt believes the strychnia to act purely as a stimulant to the nervous matter of the nerves or their capillary system.

The cases in which the exhibition of strychnia is contra-indicated are those, where the amaurosis depends on any mor-

bid condition of the brain, any alteration in the osseous structure of the foramen opticum, on tumours, or any other substance pressing on the optic nerve, and on various structural derangements of the internal organ of vision, the result of previous inflammation.

There is no doubt that cases of amaurosis sometimes occur, where it is impossible by symptoms to discover the peculiar condition on which this state depends; but certainly it is our duty, before proceeding to use any remedy like the present, to endeavour to do so, by examining the eye, and carefully reviewing the history of the case.

In order to give as full an account as possible of the efficacy of strychnia in the treatment of amaurosis, I shall relate in full one of Dr Shortt's cases, and give the rest in a tabular view.

Case I.*—"Peter Hamilton, æt. 22, an iron founder, admitted 16th June 1829, can only distinguish light from darkness. Both pupils are much dilated, the right more than the left. The iris in both is sensible to the stimulus of light. The eyes are clear, and, with the exception of a slight squint, present a natural appearance. This state of vision has continued for two years. His account of its commencement is as follows:

Having been for some years daily working under exposure to the heat and light of an iron founder's furnace, he became affected with flashes of light, when looking at minute objects, or when stooping. This indistinctness gradually became more and more obscure, for fifteen months. At the end of this time he could only distinguish light from darkness, and has remained in that state for nine months. His general health had all along been quite good.

17*th.* The temples were shaved and blistered, and one-eighth of a grain of strychnia dusted the following day on each side.

23*d*, (6*th day.*) Within the last week a blister has been

* Ed. Med. and Surg. Journ. vol. xxxiv. 417, *et seq.*



twice in succession applied to each temple, and to the raw surfaces, first one-eighth, then one-fourth, and to-day half a grain of the powder of strychnia. The pupils are less dilated, and the iris readily contractile; strabismus almost gone; tongue rather foul; bowels open.

25*th.* Can to-day distinguish colours pretty readily, and especially with the left eye, the iris of which is less sensible than that of the right. Half a grain was applied to each temple.

26*th.* Still continues to improve, and can distinguish yellow and red colours; some headache, and tongue much loaded and white. $\frac{3}{4}$ of a gr. to each surface: a cathartic mixture.

27*th.* Less headach; sight considerably improved, for he can distinguish print from writing. 1 gr. applied to each surface.

28*th.* Vision more distinct. Had an additional grain and quarter yesterday. Had $1\frac{1}{2}$ gr. on each surface.

*July* 2*d*, (15*th day.*) Had $1\frac{1}{2}$ gr. on the 30th. On the 1st, an attack of rigors, debility, sickness, vertigo, and headach, which are now gone, but feels weak. Can now clearly distinguish objects placed at the distance of some paces, and reads easily the hour upon a watch by evening twilight. Iris of both eyes quite sensible. Intermit strychnia.

4*th.* Sight still further improved. Renew the blisters, and $\frac{1}{4}$ gr. of the powder.

13*th.* Can now distinguish objects clearly at considerable distances. Pupils continue more contracted, although less than naturally. Strychnia from $\frac{1}{4}$ to $\frac{3}{4}$ of a gr. has been applied as before.

26*th.* Strychnia has not been applied since last report, from a sensation of violent heat over the skin.

*August* 4*th.* Since last report, 2 grs. have been applied to each temple, without any obvious effect; but improvement in vision continues.

16*th.* Has had 2 grs. on each temple for eight days. Repeat blisters, and apply $2\frac{1}{2}$ grs. to each surface.

*September* 8*th*, (79*th day.*) Since the last report, he has

been applying the strychnia from 2 to 3½ grs. on each temple, without any constitutional effect, but with considerable improvement in his sight. There were some days of intermission when the blisters had to be renewed.

Yesterday he left the Infirmary, and attemped to write; but, finding that the act of stooping occasioned dimness in his sight, he returned the next day, and resumed the strychnia to the extent of gr. iij. on each temple, and continued gr. iiss. to the 13th. It was then omitted on the 31st. When he could see perfectly, he was ordered to apply the vapour of ammonia for a few days. The eyes appeared quite natural, the squinting gone, and he was able to tell the time upon the Tron Church clock from the Infirmary window,—at the distance of three hundred yards."

TABULAR VIEW OF CASES OF AMAUROSIS TREATED BY STRYCHNIA, ROYAL INFIRMARY, EDINBURGH.

These cases are detailed at length in THE MEDICAL AND SURGICAL JOURNAL for October 1830.

| Name. | Age. | Date of Admission. | State of Eyes. | Duration of Complaint. | Cause—Mode of Attack. | Previous Remedies Used. | Result of the Treatment by Strychnia. | Date of Dismission. |
|---|---|---|---|---|---|---|---|---|
| Andrew Drummond, | 34 | 1829. October 2. | Can only distinguish light from darkness. Pupils contracted, and little sensibility in Iris. | Six years. | Gradual disease, with loss during fever. | Blisters, Issues, Mercury, and various internal medicines. | Great improvement.—Can see to read the hour on a common watch. | 1829. End of Nov. |
| George Miller, | 52 | 1830. July 4. | Vision of both much impaired, but especially that of left. | Five months. | After a severe attack of Ophthalmia. | Blisters, Mercury, &c. | Considerable improvement.—Was able to distinguish objects at the distance of a quarter of a mile. | 1830. September 6. |
| William Smith, | 31 | 1829. October 13. | Pupils not dilated. Slight sensibility of Iris in both eyes. Extensive opacity of cornia in the left. | Twelve Years. | Gradually. | Blisters, &c. | Considerable improvement. | 1829. November 10. |
| James Rankine, | — | 1830. July 7. | Right eye unable to distinguish light from darkness. Pupil moderately dilated, and slightly sensible to light. Left, unable to read print of a very large size at a moderate distance. | Right eye two years. Left, 3 months. | Do. | Do. with Mercury, &c. | At first no effect; but, after the exhibition of Mercury, the Strychnia produced very considerable benefit. | 1830. July 24. |
| John Watson, | 49 | 1830. July 18. | The left eye amaurotic, but free from any morbid appearance. Also Paraplegia, with loss of power over the bladder and rectum. | Amaurosis for two years. Paraplegia for twenty days. | Do. | | March 2.—Considerable improvement in vision.* July 19.—Considerable improvement in the Paraplegia also. | |
| Walker Henderson, | 45 | 1830. June 3. | Right eye completely amaurotic. Pupil moderately dilated, irregular and insensible to light. Left eye much contracted and irregular, but contracts sluggishly on the application of light. | Right, for two years. Left, for three months. | After Iritis. | | Much relieved. | 1830. August 11. |
| Isabella Wales, | 30 | 1830. Nov. 21. | Both eyes completely amaurotic. | Four months. | From sudden suppression of menstruation. | | In this case the Strychnia was given internally, and when Dr S. published his cases, there appears to have been no improvement. | |
| Janet Barclay, | 28 | 1830. June 18. | Amaurosis almost perfect, cannot see to read the largest print. | Right eye two years. Left eye 3 mo. | Gradually. | Blisters, &c. | Dismissed cured. | 1830. July 26. |

* In this case the Strychnia was administered internally.

It has been objected, that the good effects of strychnia remain only for a short time, and that it gives only temporary relief. Of all Dr Shortt's cases, none returned except Andrew Drummond, whose eyes continued in the same state as when he left the hospital till last summer, when he found them getting weaker. He then returned to Edinburgh for the express purpose of having the strychnia again applied, which was done under Dr Christison's directions, with the same good results as formerly.

It would be almost superfluous to relate more cases of amaurosis treated by strychnia, as I think the cases now related are sufficient to show, that, in one form of the disease, where it arises from an atonic state of the retina, or any other part of the nervous apparatus of the eye, strychnia is a remedy which may be safely tried, with considerable prospect of advantage, more especially if the cases be recent.

Strychnia has been recommended and used with success, by Mr Liston, in an analogous disease, viz. deafness, arising from an atonic state of the auditory nerve; but I regret that I have not been able to collect cases where it has been thus used.

V. *Paralysis.*—The first circumstance which led practitioners to think that strychnia might be useful in this affection, was, from observing, that, when paralytic limbs became affected with convulsions, they frequently regained their use; and so, consequently, by using any remedy which would excite these artificially, it was expected the same result might be obtained. How far experience has confirmed this view, we shall now take the opportunity of examining.

Dr Bardsley's experience of the use of strychnia in paralysis is particularly valuable, he having used it in no less than thirty-four cases. Nineteen were cases of paraplegia—of these, eleven were cured, one relieved, and in only one was no benefit obtained. Twenty-one were cases of hemiplegia—of these, eleven were entirely cured, six were much relieved, two somewhat relieved, and only in two was no amendment observed; the remaining one left the hospital shortly after admission.



Dr Bardsley's cases are so interesting, so minutely and faithfully detailed, that, in order fully to illustrate that part of my subject, I shall take the liberty of transcribing a few of these cases, as published in his Hospital Reports.

Case I.—"Mary Mitchell, aged 30, admitted 28th March 1824. She has lost entirely the power of her left side, with diminished sensibility. Complains also of occasional severe headache, and is liable at times to sudden attacks of vertigo. Her articulation is much impaired. Urine and fæces passed involuntarily in bed. Corner of the mouth much drawn to her right side; pulse 86, rather feeble. Countenance pallid; sleeps ill. The attack occurred about three months ago, shortly after being delivered of twins, and has gradually increased. She attributes her complaint to overfatigue and cold when far advanced in pregnancy. Has used several remedies; but is ignorant of their nature. Ordered five leeches behind each ear, a blister to the nape of her neck, and a dose of common purging mixture of the house.

*April* 1*st.* Leeches bled freely, and blister discharged well, with relief to pain of head. Several copious stools obtained from purgative. To commence with the twelfth of a grain of strychnia, in the form of pill, twice a-day.

4*th.* Symptoms unchanged. Strychnia pill to be taken three times a-day.

7*th.* Head remains free from uneasiness. No perceptible effect from alkali.

10*th.* The dose of strychnia to be increased to the eighth part of a grain, three times a-day. Bowels regular.

14*th.* The alkali has not as yet occasioned any manifest effect upon the system. The fourth of a grain to be exhibited three times in the day.

20*th.* Has again complained of slight pain in the head, but without vertigo. She states that she experienced yesterday a slight sense of prickling in the paralytic members, which

continued for some time after each dose of the pills. No medicine required for bowels. Leeches to be repeated.

24*th*. Pain in the head very trifling since repetition of leeches. To continue.

27*th*. She appears to possess much more feeling in the affected side, as well as increased power over the paralysed muscles. Makes no complaint of pain of head this morning. Half a grain of strychnia to be taken twice in the day.

30*th*. On the second day after the exhibition of the alkali in this proportion, the patient experienced smart convulsive twitchings of the muscles of the diseased side. They are now present.

*May* 3*d*. She can move the paralytic limbs much better, and begins to feel conscious when the bladder and rectum are evacuated. To take one grain of strychnia twice a-day.

6*th*. Head became affected with stupor and vertigo, and rigid contractions of the muscles of both sides of the body supervened to her employment of the third dose of the alkali, in the proportion noticed in the report of the 3d. This quantity, however, was repeated yesterday and this morning, and has been unattended by the former severe effects of the medicine. The patient has regained a considerable degree of power over the leg and arm, and the tone of the sphincters of the bladder and rectum is much restored. Not deeming it prudent to increase the dose of the alkali, she was directed to continue the one grain twice in the day.

14*th*. This dose now occasions no inconvenience. To continue the strychnia in doses of half a grain, three times a-day.

17*th*. She is now much better; can hold a cup to her mouth when she wishes to drink, and also raise her left leg from the bed. She sits up during the day, and regularly asks for the bed-pan when she requires it. Speech more distinct. Pills to be continued.

20*th*. Continues to improve. To persevere with the pills.

28*th*. From the date of the last report up to the present period, her amendment has been rapid, for she now not only supports herself in the upright posture, with the aid of crutches, but even walks with them from one bed to another.



Her strength, articulation, and general health, are much improved. Appetite keen. She expressed a strong desire to leave the hospital, from a conviction that a change of air would effect her restoration to perfect health. She was accordingly discharged, greatly relieved, at the first meeting of the weekly board, with a request, on my part, she would inform me in case any relapse of her ailment should occur. Dr Bardsley heard from her in two months afterwards; she had recovered the perfect use of the paralytic members, and was able to attend to the affairs of her family, as well as at any former period of her life."

Case II.—"John Prince, aged 29, spinner, was admitted an in-patient September 13, 1824. Was seized, about six months ago, with loss of power in the lower extremities, after bathing, whilst the body was much heated with exercise. He is now incapable of motion without the aid of crutches. He passes his urine and feeces involuntarily; the spine is free from pain; his strength is much reduced; appetite bad; pulse 72, and rather feeble. I directed him to take pil. hydrargyri four grains every night, with a saline aperient on the following morning, for the first ten days.

On the 24th I commenced with the strychnia, in the dose of the sixth of a grain, three times daily.

*October* 4*th*. The alkali has not produced any effect upon him. Appetite somewhat improved. In other respects he remains in the same state as on his admission.

*October* 10*th*. Strychnia augmented to the fourth of a grain every fourth hour.

14*th*. Has experienced severe convulsive twitchings in the affected limbs. He is sensible of an increase of power in his inferior extremities, and wishes to rise, to make trial of his crutches.

22*d*. Is very much better. Strychnia to be taken in the proportion of half a grain three times daily.

*November* 4*th*. During this interval the alkali has been attended with great benefit. He is now capable of retaining

both his urine and fæces, and of walking from one end of the ward to the other with the aid of a small stick. His appetite is good, bowels regular, and spirits cheerful. To continue the alkali.

*November* 16*th*. He is entirely cured. In order to show the pupils of the Hospital what he could do, he ran from one end of the long gallery to the other. To be discharged at the first meeting of the weekly board.

Dr B. had an opportunity of seeing his patient several times after he left the house, and found that he continued to enjoy the use of his lower limbs."

Case III.—"Barnard Riley, æt. 43, admitted an in-patient November 4, 1824. He was seized suddenly with hemiplegia of the left side, without the occurrence of any premonitory symptoms. The power of voluntary motion in the affected side is quite gone, but its sensibility is not much impaired. His speech is almost unintelligible. His mind, however, continues clear. Strength reduced, appetite bad, bowels costive, and urine scanty; pulse 76, and of moderate strength. He complains of a dull pain in the forehead. I directed cuping at the nape of the neck, to the amount of fourteen ounces, and prescribed purgative medicine.

*November* 10*th*. Has derived great relief to pain in the head from cupping. He took more than a scruple of calomel, besides several ounces of the common senna mixture of the house, before the bowels were freely opened. The evacuations were dark, and highly offensive. A blister was applied to each temple, and a pill, with two grains of calomel and three of the compound extract of colocynth, was ordered to be taken each morning, and to be followed, in the course of three hours, by a purgative draught.

15*th*. Blisters rose well, and he now makes no complaint of forehead. The bowels have been freely unloaded. Having succeeded in removing the cerebral disturbance, and procuring a regular action of the intestinal canal, I deemed it safe to commence with the strychnia. He was, accordingly, directed to take the sixth of a grain of the alkali every fifth hour. The purgative pills were discontinued.



22*d*. Little change in the symptoms. Dose of strychnia to be increased to the fourth of a grain every fourth hour.

29*th*. Says that the affected side has been very much twitched, and that he always experiences a prickling sensation in the hands and feet shortly after taking each pill. Thinks there must be something "*quick*" in them. His bowels are regular without medicine, and his appetite much improved. Pulse 82, and soft. To take half a grain of the alkali twice daily.

*December* 9*th*. Feels much better; indeed his improvement has been very evident during the last few days. He can raise both his arm and leg, and he articulates more distinctly.

20*th*. His recovery is rapid. He walked this morning from one end of the ward to another without either crutch or stick. His speech improves daily. To take half a grain of the alkali three times in the day.

28*th*. I consider him fit to be discharged. He walks well, and moves the left arm with as much freedom as the right.

*January* 10*th*. The strychnia was continued up to this period, when the cure was rendered complete."

Case IV.—"Robert Hobson, æt. 38, finisher, admitted an in-patient October 6, 1827.

This is a case of paraplegia, the patient having lost the power over the inferior extremities, rectum and bladder. He states, that he first perceived, about four months ago, a weakness in his legs, rendering it necessary for him to use considerable effort to drag them along. This debility gradually increased, until at length he became altogether incapable of moving the lower limbs. He has no feeling in them. Head free from pain or giddiness. Pulse regular; appetite impaired. Being desirous of putting the *individual* efficacy of the strychnia to the test, I commenced with the exhibition of the alkali, in the proportion of a sixth of a grain twice

daily, without previously employing internal or local remedies of any kind.

*October* 10*th.* No change. Dose to be increased to the fourth of a grain three times a-day.

20*th.* He considers himself better, having obtained slight command over the sphincters of the bladder and rectum.

On the 14th he first experienced involuntary twitchings of the inferior extremities, which have been continued at intervals up to the present time. To take half a grain of the alkali twice daily.

28*th.* He is in excellent spirits, owing to the benefit he has derived from the use of the pills. He can raise the lower limbs to some height from the bed, and also retain at pleasure both his urine and fæces. During the last week, the twichings have been rather severe, but not painfully so. He is very desirous of persevering with the pills. To continue.

*November* 7*th.* Since the last report, the patient has been allowed to sit up for several hours during the day. He is surprisingly improved, being able to walk, without the aid of a stick, from one end of the long ward to the other. Appetite good. Bowels regular. Warmth and sensibility of inferior extremities natural. Half grain pill to be taken three times daily.

26*th.* The additional half grain excited for some days powerful twitching in the legs and thighs; but, in the course of a week or less, they became not more severe than was occasioned by half a grain of the alkali taken twice in the day. He is now capable of walking as well as at any former period of his life, and his general health is excellent. It is impossible to describe the gratitude which this patient felt for his restoration to health. He was ordered to be discharged *cured*, at the first meeting of the weekly board."

Case V.—"Margaret Royle, æt. 17, was admitted an inpatient on the 3d of April 1828.

This young woman had only menstruated twice, shortly after her sixteenth year; and it appears from her mother's account, that she imprudently exposed herself to cold when the menses were last present, and since that period she has never been free from ailment. She first perceived a numbness in her lower extremities about eight months ago, which was followed by a gradual inability to move them. She has now neither power nor feeling in them, or in the bladder or rectum. No pain in the head. Appetite tolerably good. Pulse 74, of moderate strength. No apparent disease in the skin. I directed her to take, on the following morning, the eighth of a grain of strychnia, and to continue that dose twice daily. *No other internal or external remedies to be employed.* Has taken her medicine with regularity, but has not yet derived any benefit from it. Dose to be increased to the sixth of a grain at the same interval.



16*th.* Is somewhat improved, being able to move her toes occasionally. Says that her legs have been much twitched during the last week. To continue the medicine.

26*th.* The good effects of the remedy have been very evident since the last report. She can now retain both her fæces and urine, and walk from one bed to another, with the help of a small stick. Her power over the affected limbs increases daily. Fourth of a grain of the alkali to be taken three times in the day.

*May* 10*th.* She is now in perfect health, and walks as well as any patient in the hospital. To be discharged cured. Dr B. saw this patient some months afterwards, and had the satisfaction to learn that she had suffered no relapse of her malady.

Dr Balfour, in the essay already quoted, mentions six cases of different kinds of palsy, which, while acting as clerk in the Edinburgh Infirmary, he saw treated by Professor Duncan. Three were cured, and the remainder obtained various degrees of relief. Dr Duncan did not confine himself to strychnia alone, but varied it with the extract of nux vomica.

Dr A. T. Thomson, in the paper to which I formerly alluded, gives the details of two very interesting cases of hemi-

plegia, where strychnia was given with success; and several such are to be found scattered through the different British and Foreign periodicals. As far as my own observation goes, either from the cases which I have *seen* treated, or had under my own care, the results have been by no means so fortunate as in Dr Bardsley's practice. At the same time, I ought to state, that some very remarkable and unexpected cures have taken place from the use of this remedy.

One I shall mention, May 14, 1832, Agnes Morison, æt. 26, residing in High Street, has been confined to bed for nearly two years, from total loss of power in the lower limbs. Sensation was a good deal impaired, but not altogether lost; she is sensible if pinched or pricked. The fæces and urine frequently, but not generally, are passed involuntarily. She ascribes her complaint to an injury, or a supposed injury, which she received during the delivery of her second child. She has undergone a great deal of medical treatment, chiefly blisters and issues. Strychnia, in the form of pills, in the proportion of one-sixth of a grain, was ordered three times a-day; it was gradually increased to one-fourth of a grain, after which violent convulsive twitches of the limbs and the whole body took place. In sixteen days from the first commencement of the remedy, improvement in the power of the limbs was observed. This went gradually on, till, at the end of two months, she was able, with assistance, to be removed from bed; and, at the end of about three months more, she could walk about, and take some management of her house. She ultimately completely recovered. In this case, no remedy was used externally, and nothing but the strychnia and laxatives internally.

Of the use of strychnia externally applied over a blistered surface, I can speak very favourably. The first time I saw it thus used was in the practice of Mr Liston, in the Royal Infirmary. The case was one of partial paraplegia, arising from a fall; various remedies had been used previously, but without benefit. A blister was ordered to the lower part of the spine, and the surface was sprinkled with strychnia daily. In



the course of a few days, the usual twitchings and startings from the use of the drug made their appearance, and, within two months, the man was discharged perfectly cured.

Besides this, I have seen several other similar cases.

In local palsies, strychnia applied in this way will be found very useful, as may be seen from the following cases:—

Case I.—*Paralysis of Fore-Arm.*— —— Forrest, æt. 53, July 14, 1832.

Nearly two months ago he suddenly lost the use of his right fore-arm and hand. The sensation is perfect; but he cannot extend his wrist or fingers. Shortly after the occurrence of the malady he applied to a surgeon, who blistered the parts twice; but that doing no good, he inserted a number of needles, which was attended with as little success.

As the case seemed a good one for testing the powers of the strychnia, I ordered a small blister to be applied to the back of the fore-arm, and $\frac{1}{4}$th of a grain of the alkali to be applied daily. This was gradually increased to $1\frac{1}{2}$ grain, after which the usual constitutional effects manifested themselves with violent startings of the limbs. At the end of the second week, the arm obviously had more power, and an almost constant sensation of prickling along the fingers. Six weeks after the commencement of the treatment, he was dismissed cured, and able to resume his occupation as a joiner.

Case II.—*Paralysis of Fore-Arm.*—Michael Fox, æt. 20, a labourer, of strong and robust habit, suddenly lost the power of his fore-arm, after sleeping on the grass during his dinner hour. The strychnia was used as above, and a complete cure effected in less than three weeks.

Case III.—Retention of urine from paralysis of the muscular coat of the bladder.

James Moir, æt. 63, a silversmith, applied to me, in great misery, from inability to evacuate his urine. He stated, that, some time ago, he remained too long without voiding

urine, and drinking pretty freely at the same time. The consequence of which was, that he became unable to make any water at all, and it had to be withdrawn by an instrument. Since then he has occasionally suffered from retention of urine, and always is obliged to have recourse to surgical aid for relief. In the present instance he was at once relieved by the introduction of the catheter; but, from this time, he never could evacuate the bladder without artificial assistance. From the report of Dr Bally at La Pitié, I thought the strychnia might be of service.* A blister was ordered to be applied to the sacrum, and the raw surface to be sprinkled with the strychnia. At first, no obvious effect was produced, till one day, after very severe twitchings, which alarmed the patient much, the urine came away involuntarily. After which, the bladder seemed gradually to regain its tone, though I did not deem it prudent to give up the remedy, but continued it for some time in very minute quantities. This man I saw a short time ago, and he still continues well.

In paralysis of the face, from functional derangement of the portio dura, strychnia is often very useful. True it is, that often the disease is temporary, and will yield to very simple remedies, a mustard plaster, for example, but occasionally, in spite of all the usual remedies, the paralysis continues, leading the practitioner to fear, that there must be some organic change. In one case, which I saw last summer, the patient had been cupped, repeatedly blistered, &c. without benefit, yet it yielded, in a short time, to blistering, with strychnia applied as in the foregoing cases.

Mr Liston, as I have already mentioned, uses strychnia with much success externally. The same has been done by Dr Auchincloss at Glasgow, and by Dr Bally at La Pitié. The latter author, indeed, considers it more efficacious applied externally than given internally.

In cases of paralysis, arising from the introduction of lead

* Dr Bally exhibited the medicine internally; he relates three cases which were cured in this manner within a month.



into the system, Andral has found the administration of strychnia to be useful.—(*Mag. Journ. de Physiol.* t. iii. p. 266.)

M. Lerminier, at La Charité, gives his history of five cases of this kind, treated by this substance; in the first, a case of paralysis of the wrists, the alkali was gradually increased from eight-twelfths of a grain to two-thirds, twice a-day; after the latter dose, the patient soon complained of a painful sensation of cold in the extensors, which was speedily followed by a spasmodic contraction of these muscles. This case was completely cured within a fortnight. In the second case, which was similar to the last, the strychnia produced a tetanic affection of all the muscles, after which the patient rapidly recovered. In the third case, the paralysis was in no degree relieved, though the remedy was pushed to such an extent as to produce violent constitutional effects. In the fourth case, slight improvement took place. In the fifth, trismus took place to such an extent, that the patient became alarmed, and would go on no longer with the remedy.—(*Clinique Med. de M. Lerminier, pub. par M. Andral.*)

It is impossible to attend to the history of the cases which have just been related, without being convinced, that, in many cases of paralysis, strychnia may be used with the utmost advantage. But, in a disease like paralysis, varying in its symptoms, produced by such opposite causes, and depending on so many different pathological states of the system, the same remedy or method of treatment can never be applied to all.

It is obvious, that, in those cases of paralysis which arise from organic lesions of the brain or spinal cord, little benefit can be expected from any remedy or treatment whatever; to employ strychnia, in such cases, would only be to accelerate the fatal termination. But, on the other hand, in those cases where the paralysis seems to depend on functional derangement of the nervous system, or, as Dr Bardsley expresses it, "on diminished nervous energy," under which head may be included cases arising from the introduction of lead into the system, from drunkenness, from exposure to cold, from concussion of the spinal cord, as in falls, from rheumatism, hy-

steria, &c., and also in various kinds of local paralysis, strychnia may be used with great advantage.

Dr Bardsley lays it down as a practical rule, always when there is any determination of blood to the head, or if the patient is of a plethoric habit, to have recourse to the ordinary antiphlogistic treatment, before resorting to the employment of strychnia.

It is necessary, however, to mention, that there is great room for deception in the treatment of paralysis. The disease frequently depends on temporary causes, as some slight effusion that will become absorbed without the aid of any medicine, or from slight congestion that will cease of its own accord, so that in such cases any remedy whatever that might be used at the time would get the credit of having accomplished a cure.

The fact, then, of the spontaneous cure of paralysis ought to make us cautious in drawing conclusions regarding the efficacy of any one particular remedy.

But I think the cases which have just been detailed are, in a great measure, free from this source of fallacy. They are of a sufficient number to show, that the result obtained was not accidental, as some might feel inclined to say, had a few solitary cases only been brought forward; and they had existed for such a length of time as to have given nature a sufficient opportunity to perform a cure, if she could do so unassisted. And, moreover, most of them had previously been subjected to the more ordinary methods of cure.

Duly weighing what has been now stated, I think we can hardly help coming to the conclusion, that strychnia is a very valuable remedy, and one from which much may be expected in the particular kinds of paralysis already specified.

*Dose and mode of exhibition of Strychnia.*—As this substance, from its large price, is very frequently adulterated, and often contains a portion of a kindred alkali, brucia, which is at least one-twelfth weaker than strychnia, it is unfortunately found, that its strength varies considerably. So



inefficacious is some of the strychnia purchased in the shops, that I have seen two grains given to a rabbit before it was sensibly affected by it.

From the variety of the strength, and the very powerful, and sometimes poisonous, effects of the remedy, on some constitutions, it behoves us to administer it with the greatest caution, beginning with the smallest doses one-eighth or one-twelfth of a grain, in the form of pill, with bread crumb twice or thrice a-day, carefully watching the effect on the system, and gradually increasing the dose till twitches of the muscles take place. After that the quantity need not be increased, but even may be lessened or suspended for a time. In those cases where very severe spasms are induced, the exhibition of thirty or forty drops of the solution of the muriate of morphia will relieve them. Externally it is best applied over a raw blistered surface; the quantity used varies from one-fourth grain to two grains daily, or even more, according to the constitutional effect produced.

I shall now bring this paper to a close, by briefly recapitulating the conclusions to be drawn from the facts already adduced.

1. The active principle of nux vomica is the vegetable alkali strychnia.

2. The physiological action of strychnia is the same as that of nux vomica, viz. on the spinal cord, medulla oblongata, and nerves emanating therefrom, as well as on the muscles which these nerves supply.

3. Consequently, strychnia may be used in those diseases in which the preparations of nux vomica are used; and, if we could only obtain it free from adulteration, with this advantage, that it is more certain in its operation, and less variable in its effects.

4. It may be safely used, and with advantage, in obstinate cases of amenorrhœa. But we are not justified in having recourse to it, till we have made trial of the ordinary and less powerful remedies.

5. That it is a valuable remedy in chronic diarrhœa, more especially in that form of it which appears to depend on relaxation, rather than irritation, of the intestinal canal, and which so frequently baffles the more general and usual modes of treatment.

6. Like most other remedies, it is of no use in cholera.*

7. It may be used, with considerable prospects of success, in certain forms of amaurosis, (already specified.)

8. It is an excellent remedy, one of the best we are yet acquainted with, in certain cases of paralysis, which do not depend on organic lesions, but on functional derangement of the nervous system; and many cases deemed hopeless under the ordinary modes of treatment may be cured by it.

* It is proper to mention here, that Dr Mackintosh comes to a very different conclusion, viz. that it is of more use than any other remedy in cholera; and he says still further, were the disease to reappear, he would again have recourse to this medicine, and in larger doses.

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With Dr Marr's Comp

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ON THE

# NATURE, MECHANISM, AND TREATMENT

OF

# FACE PRESENTATIONS.

BY

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(*Extracted from the Lond. and Edin. Med. Jour. for Feb.* 1842.)

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# ON THE NATURE, MECHANISM, AND TREATMENT OF FACE PRESENTATIONS.

Perhaps there is no point connected with practical midwifery where so much discrepancy of opinion exists as regarding face presentations. This is the more wonderful, seeing that from their frequency they form a large proportion of the deviations from the natural position, which every obstetric physician must meet with in practice.

The proportionate frequency is seen from the following table:

| | Number of Deliveries. | Number of Face Presentations. |
|---|---|---|
| Boivin | 20,517 | 74 |
| Lachapelle | 22,243 | 103 |
| Kilian | 17,000 | 122 |
| Boer | 6,555 | 58 |
| Dubois | 10,742 | 30 |
| Clarke | 10,317 | 44 |
| Collins | 16,654 | 33 |
| Guy's Hospital | 4,666 | 24 |
| Total, | 108,694 | 488 |

This is about 1 in every 222 cases.

In former days face cases were considered preternatural, and so difficult as generally to require the operation of turning, the same as transverse presentations, before delivery could be accomplished. This was the opinion and practice of the accoucheurs of the last and preceding half of the seventeenth century. Smellie says, "when the face presents, resting on the upper part of the pelvis, the head ought to be pushed up to the fundus uteri, the child turned and brought by the feet, according to the directions that will be given when we come to treat of preternatural deliveries." (*Treatise*, vol. i. p. 238.)

Burton states, "The head may come with the face or chin towards the os uteri, having the back of the head lying backwarks. * * * Therefore when the head presents in any of the above directions, and that the *os uteri* is sufficiently dilated, he must introduce his hand into the womb along the child's breast, to bring it forth by the feet." (*New System of Midwifery*, p. 200.)

The same opinion was held by La Motte, Cooper, Giffard, Fischet de Flechy, &c.

Other authors, averse to so formidable an operation as turning, proposed to alter the position by pushing up the face and bringing down the vertex. This was the plan recommended by Stein and Baudeloeque, both of whom declare that the spontaneous termination of face presentations is only possible, when the fœtus is very small or the pelvis very large.

Most of the authors whom we have just quoted, if they failed in the operation of turning or rectifying the position, terminated the labour by the forceps or crotchet.

In opposition to these doctrines, we find, even as far back as 1685, Portal stating that face presentations may with safety be left to nature. His words are: "I have delivered several women whose children came with the face foremost, and always without any difficulty; it being only observed, that in such cases no violence must be used, but nature left to its own course, which done, there is no danger either of mother or child." But, unfortunately, in the preceding page, having stated that these cases are "plus contre nature," his observations regarding the natural termination did not meet with the attention it otherwise would have obtained. In 1769, W. Johnston in this country, in 1770, Deleuyre in France, and in 1789, Zeller in Germany, all declared that face presentations, though more tedious than when the head presents, may successfully be left to the unaided efforts of nature. Zeller cited 43 cases out of 3155 deliveries which terminated thus. He was followed by Boer, who carefully observed 80 face cases, of which none of the mothers suffered more than in ordinary labour, and only four children were still-born; of these only one required artificial assistance, the forceps being the mode of delivery adopted. Denman, I ought to mention, coincided with these authors. Strange to say, the same discrepancy of opinion still seems to pervade the profession in the present day. Thus Burns says, "in face presentations, some have advised that the child should be turned, and this is proper, if the membranes being still entire, any circumstances on the part of the mother render it desirable that the labour should be soon completed, at the same time that the pelvis is ample, and we expect an easy delivery of the head to follow that of the body. But if there be no urgency, from weakness, or any other state of the mother, or of the pains, it will be better merely to rectify the position of the head itself, by raising the forehead, turning the vertex obliquely down, and directing it to the left acetabulum." (*Midwifery*, p. 431.)

Davis is even stronger on the propriety of interfering in these cases. His words are, "when the face is discovered to present at the brim of the pelvis, at an early period of a labour, whether before or very soon after the escape of the liquor amnii, there can, in the author's opinion, be no doubt as to the preferableness



of turning to all other modes of treatment. That operation dexterously performed, would, at all events, give the child a good chance of preservation of its life; whilst it would also be the means of rescuing the mother on the very brink of impending danger." (*Obstetric Medicine*, p. 990.)

On the continent, the same view is espoused by Capuron, one of the most distinguished accoucheurs of the present day. He, like Mesnard, endeavoured to demonstrate by geometrical measurements of the pelvis, in reference to the child, that in face cases, delivery is impossible, without the assistance of art. (*Bibliothèque Méd. Analys. de Mme. Lachapelle, &c.*) Flamant joins in the same view. (*Stolze Thèse*, p. 37.)

On the other hand, we have many authors of the greatest talent and experience, both on the continent and in this country, following Portal, Deleuyre, &c., and advocating the sufficiency and success of the unaided efforts of nature in these cases. Among these we may enumerate Mme Lachapelle, Chevreuil, Desormeaux, Velpeau, Bang, Pacoud, Kilian, Stolze, Blundell, Merriman, Ramsbotham, and Rigby.

Seeing, then, such very conflicting opinions on a matter of so much practical importance, I propose, in the first place, to glance shortly at the causes and mechanism of face presentations, and then to examine separately the different modes of treatment proposed, with the view of determining that which is the most successful, and which, therefore, ought to be pursued in these cases.

*Causes.* These are still obscure. Burns says, "generally no evident cause can be assigned." Deventer ascribes them to obliquity of the uterus, whereby the occiput, being brought in contact with the brim of the pelvis, is caught there, while the pains continuing, the occiput being fixed, first the forehead and then the face is forced down. In favour of this view, is the fact of the frequent occurrence of face presentations, when deformity of the brim of the pelvis exists. Gardieu considers the obliquity to be rather in the fœtus itself. Sometimes they exist as original presentations, as in two cases recorded by Mme. Lachapelle, where the females died near the full time, but before labour had commenced.

For my own part, I consider all these opinions as partially correct, though it would be difficult by them to account for every case. In general, I believe these presentations to be mere transpositions of the vertex, from the head moving on its transverse axis, and thereby causing the chin to leave the sternum, and first the forehead and then the face coming down. In confirmation of this we have only to allude to those cases where the change has been observed to take place during labour. I myself have witnessed cases, where, at the commencement of labour, the head

could be detected resting on the brim, but as the process advanced the face came down. Rigby mentions having seen cases, "where the presentation was midway between one of the cranium and the face," in which the face ultimately presented. Merriman, on the other hand, observes, "that he has twice known the presentation of the face, converted by the pains alone, into a natural presentation." (*Synopsis*, p. 48.)

Mr Ziegler some time ago, at the Obstetrical Society, mentioned an ingenious way of accounting for face presentations, on the supposition, that the hands of the fœtus, being forced down from the breast against the chin by the action of the uterus, pushed it from the sternum, and occupying the space between them, forced the chin down, and of necessity caused the face to descend. Mr Ziegler stated at the same time, that it was from observing the hands come down immediately after the head in face cases, that he had been led to form this opinion.

*Varieties of Face Presentations.*—These, like those of the cranium, have been most perplexingly and unnecessarily multiplied. In both it has been too much the custom to describe the varieties which authors *could* make, instead of carefully examining those which really exist in nature; thus forgetting one of the first rules of the illustrious Bacon—"*neque fingendum aut excogitandum sed inveniendum quid natura faciat aut ferat.*" Systematic authors, Baudelocque, Burns, Campbell, &c., enumerate six varieties, viz. with the chin to either *acetabulum*, either *sacro-iliac symphysis*, *pubes*, or *sacrum*. Some contrive to make even more. Nægelè, and Mme. Lachapelle, two greater names than whom, either for extent of experience, or carefulness of observation, scarcely can be found, limit these varieties to two.

This division has the advantage both of simplicity, and of comprising all the real varieties to be met with in practice. If, as we have just stated, face cases are transpositions, inversions, as it were, of the vertex, surely we ought not to have more varieties of the face than of the head itself. True it is, that, strictly speaking, we have four different positions of the cranium; but as Rigby has very ably shown in his late publication, these may all be included under two. The simplicity of this arrangement is peculiarly advantageous in face presentations, because it does away with the perplexity and confusion which the multiplicity of varieties under the old method always occasioned.

*The first position of the face* is where the forehead is to the left acetabulum, and the chin is to the right sacro-iliac symphysis,—is where the chin is to the *right ileum;* this corresponds to the first and fourth positions of the vertex; the *right cheek* forms the presenting part, and as in cranial presentations the caput succedaneum is situated on the right parietal bone, so here it is on the right cheek.



*The second position* is where the chin is to the *left ileum;* this corresponds to the second and third positions of the vertex; the left cheek forms the presenting part, and on it the swelling is situated.[1]

The relative position of these two varieties is stated as follows:—

| | First variety. | Second variety. |
|---|---|---|
| Madame Boivin . . . | 41 | 31 |
| Lachapelle . . . | 58 | 45 |
| Nægelè . . . . | 14 | 8 |

*Mechanism.*—In the first position, the face enters the pelvic cavity, with the chin towards the right ileum, the right cheek being lowest down, and forming the presenting part. As it descends, the chin glides forward till it arrives at the pubes, while the head, in the same proportion, moves into the hollow of the sacrum. The expulsive power continuing, the chin emerges from beneath the pubic arch, followed by the head, sweeping and distending the perineum enormously.

In the second position, the face descends in a similar manner; and the chin, as in the former, is placed under the pubic arch. The left cheek forms the presenting part, and the chin, instead of moving from right to left, as in the first position, passes in this from left to right.

Another explanation has been given, viz., that the forehead arrives at the pubic arch, but, being too broad to pass under, is forced up behind the symphysis pubis, while the chin at the same time traverses the perineum. But this evidently is impossible when the child is of the natural size, for to allow the head to pass in this way, would require a neck of at least eight inches in length.

According to Smellie, Ryan, &c., occasionally the face comes in apposition with the coccyx, the long diameter of the face being in the antero-posterior diameter of the pelvis; but this cannot take place unless the fœtus be immature, because, in the course of delivery, the head and breast of the child would be engaged in the antero-posterior diameter of the pelvis at the same time.

From the account of the mechanism which has just been given, we see there exists evidently a close analogy between face presentations and those of the cranium. The great difference between them is, in the latter, the head forms a cone, passing with

[1] In formerly lecturing, I used to describe these two positions thus:—*First*, With the forehead to the left acetabulum, and the chin to the right sacro-iliac symphysis. *Second*, With the forehead to the right acetabulum, and the chin to the left sacro-iliac symphysis. But as the face does not always observe the exact obliquity here described, and as the above is much more simple, and for all practical purposes sufficient, I prefer it.

the apex first; whereas in the former, the base of the cone passes first, and perhaps there is also a slight increase in the size of the tumour. But it is not so much any increase of size that we are to look to, as the incompressible nature of the bones of the face, and, consequently, the impossibility of their being moulded or adapted, as it were, to the passages, in the way the head can. Burns, although an advocate for interference in these presentations, after giving the minute measurements of the face, makes the following statements:—"On comparing these dimensions with the capacity of the pelvis, we see that there is space for the head to pass, though not so easily as when it presents naturally." (*Midwifery*, p. 431.)

If, then, what has just been stated in regard to the nature of face presentations, and their mode of transmission through the pelvis, be correct,—and Nægelè says, that during an extensive practice of twenty years, he has never seen a case where the face took any other direction than the one just described—the conclusion forces itself upon us, that unless some unusual disproportion or deformity exists, nature should be able to accomplish delivery without the aid of art.

*Treatment.*—1. *Rectifying the position.* "By raising the forehead, and turning the vertex obliquely down, and directing it to the left acetabulum." (Burns, op. cit. p. 432.) Several of our leading authors have, with Burns, under some restrictions, recommended this mode of treatment; and we feel convinced that it too often is had recourse to in the present day, with any but advantageous results. Ramsbotham, in reference to it, says, "that it is impossible, by any counter-pressure, to make a beneficial change in the situation of the head under a face presentation."

Any one reflecting on the size of the head, which, in its occipito-mental diameter is five inches, and the manner in which it is placed in these cases, must see at once that it is physically impossible to turn the head in this axis through the cavity of the pelvis, which is only four inches and a half, so as to make the chin approach the sternum, and allow the vertex to come down.

Therefore I have no hesitation in saying, that not only can no good be obtained by attempting this change of position, but that there is a risk of doing positive harm by interfering with the mode of delivery which nature, as we have already pointed out, takes in those cases.

2. *Turning.*—This mode of treatment is the oldest, but, as we took occasion to mention, is still recommended by some of the most recent authorities in the present day, men whose opinions, from the position they occupy, unfortunately in the present instance, must have considerable weight with the profession.

The objections which we have to offer to turning are:—

1. That it subjects the woman to considerable risk.



2. That more children are lost in footling cases, whether original presentations, or made so by turning, than in face presentations when left to nature.

3. That the operation is unnecessary and uncalled for, because nature, without the assistance of art, can accomplish delivery.

That the operation of turning subjects the *woman* to considerable risk scarcely any one can doubt. By referring to the published reports of different hospitals, or the valuable statistical data collected by Churchill, we find that turning proves fatal to the female in the proportion of about 1 out of every 15, where it is had recourse to. Some have objected, that it is unfair to take *all* the cases where this operation is required, some of which, placenta prævia, for example, from their nature alone subject the woman to considerable risk, and compare them with face presentations, where no such danger exists. But these cases are so few, as scarcely to influence the calculation, when taken from all cases on a large scale like the present.

Others, again, have brought forward individual cases where they have turned successfully in face cases,—I myself can do the same. The second case of midwifery which I attended after settling in country practice, was a face presentation, where I turned successfully, both as regarded mother and child. But, on the other hand, I know of cases where every precaution was taken, where the operation was performed with all the skill and dexterity which ample opportunity and experience could give, where both mother and child have been lost.

"Are we then justified," to use the words of a late able reviewer, "in subjecting any woman to even a fraction of this danger in rectifying or attempting to rectify a presentation, any supposed difficulties connected with which, nature every day shows to us, she can easily overcome without the assistance of art."

The second objection seems equally well founded. In original footling cases, it is calculated that 1 in every 4 children is lost from pressure on the cord and other causes, which we need not allude to here; while in the operation of turning, Churchill has shown, by taking the results of no less than 542 cases, that the mortality to children thus brought into the world is 1 in 3. Contrast this with the mortality to children in face presentations, where no interference takes place. This is well seen in the following table:—

| Authors. | No. of Face Cases. | No. of Children Lost. |
|---|---|---|
| Boer, | 80 | 4 |
| Chevreuil, | 18 | 3 |
| Collins, | 43 | 4 |
| Total, | 131 | 11 |

This gives a mortality of 11 in 131; but if we deduct one of Collins' cases, which was a (anencephalous) monster, it makes only a loss of 10 children, or 1 in 13.[1]

But the last is the strongest objection of all, viz. that the operation is unnecessary and uncalled for. When speaking of the mechanism of face presentations, I endeavoured to show that there existed such an adaptation between the dimensions of the face and the capacity of the pelvis through which it had to pass, as to leave little room for doubt as to the capability of the one being able to be transmitted through the other by the natural efforts alone. But this doubt, if any did exist, is proved, beyond the reach of any fallacy to which the rule or compass, however carefully applied, is liable, by experience on living nature, taken, not merely from the observation of one individual, but of several, who, from their situation as physicians to large hospitals, must have had every means of verifying or refuting this important fact. The mass of evidence is now so great—amounting to no less than 412 cases, and many more might be added—as, I trust, for ever to decide this question, and to establish as a law in practical midwifery, that in all ordinary face presentations, nature is capable of accomplishing delivery. The evidence I now bring forward in a tabular form.

| Authors | Hospital, &c. | No. of Face Cases which terminated without assistance. | Reference. |
|---|---|---|---|
| Zeller. | Vienna. | 43 | Observat. sur differens objets relatifs à l'Art des Accouchemens, &c. Vienna, 1789. |
| Boer. | Do. | 80 | Boer, Natürliches Geburtshülfe, erstes buch, p. 137. |
| Chevreuil. | Maternité Hospital, Angers. | 18 | Manuel d'Accouch. p. 84, 1826. |
| Collins. | Dublin. | 33 | Practical Treatise, p. 33. |
| Velpeau. | Paris. | 6 | Traité de l'Art des Accouch. vol. i. p. 526. |
| Bang. | Copenhagen. | 10 | Soc. Méd. de Copenhagen, &c. 1816. |
| Pacoud. | Bourg. | 100 | Maternité de Bourg. &c. Fevrier 1833. |
| Kilian. | Prague. | 122 | Bulletin de Ferussac, tom. xxv. p. 352. |
| | | 412 | |

But though we have taken some pains to prove, that in face presentations, it is not necessary either to change the position of the head, or to turn the child, in order to accomplish delivery,

[1] This might be made even lower, because Chevreuil mentions, that in his three fatal cases, death was supposed to have taken place before delivery.



yet there are several points, which render their treatment different from ordinary cranial presentations. As we have already stated, the head in face cases occupies a less favourable position for transmission, than in ordinary presentations, and from the nature of the bones of the face, they can neither overlap each other, nor adapt themselves with the same facility to the passages that the head did, it is obvious that we require to take every precaution to ensure complete relaxation of the passages, and carefully to avoid every thing at all calculated to retard uterine action. These indications are best fulfilled:

1. By bleeding, provided there exists no contra-indication, on the part of the patient, to prevent it. In first labours, where there usually exists more rigidity of the passages than subsequently, this remedy is particularly called for.

2. The membranes should be preserved entire as long as possible. By so doing, we secure more complete dilatation of the parts, and prevent many of the injurious effects of pressure, both on the mother and the child.

3. The bladder and rectum should be emptied. The former viscus requires to be carefully watched, because, from the pressure of the chin on the urethra, retention of urine is very liable to take place.

4. A frequent cause of protraction, is the descent of a portion of the os and cervix uteri, which, becoming wedged between the head and the pelvis, is productive of serious inconvenience, to say nothing of pain and danger to the patient. This, as Hamilton pointed out in other cases, may be readily overcome, by carefully and gently supporting the os uteri during each pain, till the presenting portion descends, and the protruded portion recedes.

A caution should also be added to support the perineum carefully, because, from the enormous distension to which it is subjected, it is much more liable to be lacerated than in ordinary cases.

A common impression in face presentations, is, that the delivery necessarily must be tedious and of long duration. This, however, is incorrect. In the Dublin Hospital five cases terminated within an hour; eight during the second hour; and fourteen between the third and the sixth hour. In Guy's Hospital practice, thirteen terminated within twelve hours; nine within eighteen hours; and of the remaining two, one lasted twenty-one hours, and the other twenty-nine.

But in face cases, difficulties and delay may arise in the same way, and from the same causes, as in cranial presentations. Here the same principles must regulate the treatment, whether nature can any longer be trusted, or recourse should be had to instrumental assistance.

With regard to the kind of instrument, most authors prefer

the lever to the forceps, and they recommend it to be passed into the hollow of the sacrum over the occiput, as a tractor, in order to make the occiput descend. Considering how completely the hollow of the sacrum is filled by the cranial tumour in these cases, and the difficulty there is of introducing any instrument in this direction, coupled with the fact, that it is not the occiput but the chin which ought first to descend, I would humbly suggest, that in most cases the forceps will be found the best instrument. But whichever instrument we prefer, the great point is to remember the mechanism of these cases, and in the course of the delivery, ever to make the head descend in the direction which nature herself has pointed out. By forgetting this, or bringing the head down in a different manner, delivery by the forceps or lever becomes impracticable, and then the only resource left is to terminate labour by the perforator.

EDINBURGH: BALFOUR AND JACK.

To J. W. Fleming. Esq
with the best wishes of the Author

Edinburgh
Nov. 16. 1841.

# DR LONSDALE'S INQUIRY REGARDING THE HYDROCYANIC ACID.

*(From the Edin. Med. and Surg. Journal, No. 138.)*

*An Experimental Inquiry into the Physiological Action, the Poisonous Properties, and the Therapeutic effects of the Hydrocyanic Acid.* By HENRY LONSDALE, M. D. Member of the Royal College of Surgeons, London, &c.

I. *On the Physiological Action of Hydrocyanic Acid.*—IT is unnecessary to remind any one conversant with the history of the hydrocyanic acid, that much discordancy exists between the statements of those who have, or are said to have, pursued an experimental inquiry, to elucidate its physiological action. And since no agent can with confidence be applied therapeutically of whose effects on the healthy functions we are ignorant, it is almost superfluous to say that questions of doubt have arisen in the mind of the physician, upon the reputed medicinal power of this substance, on the grounds that satisfactory physiological data have not been furnished him.

Many deplorable sacrifices of human life, and a vast number of experiments on the lower animals, have fully established the accuracy of the announcement made by Schrœder of Berlin in 1802, that prussic acid is a poisonous agent. Three years after, Emmert's Inaugural Dissertation was published at Tubingen, containing numerous experiments and original facts.* Coullon, ignorant of what had been done in Germany, selected the same subject for his Thesis, when about to graduate at Paris, † and was amongst the first in France who observed the effects of this acid on vegetables. Ittner pursued the same investigation in Germany.‡ M. Weicht § published an essay at Strasburg in 1813, in which he gave an analysis of what had previously been done by others. The inquiry now excited the attention of experimentalists, and more particularly in France; for it appears that no less than three separate essays ‖ were published in the same number of years.

On observing that great authorities were opposed in opinion to each other on one essential point, viz. the manner in which the vital functions are arrested, I deemed it requisite to test by a further appeal to experiment such of their statements as appeared to wear an aspect of contradiction or uncertainty. These experiments were, of course, made on the lower animals, which can afford only analogical evidence of the effects of a poison on the human species, however it may be remarked in support of the inferences I have drawn from such a source, that the greatest similitude is observed in the physiological action of the prussic acid on man, and some individuals of the class Mammalia.

The experiments are divided into three classes. 1. Those made with the diluted or medicinal acid of this country, which contained 3½ per cent. of anhydrous acid. 2. Those made with acid containing 12 per cent. of pure acid. 3. Those with the anhydrous acid. Twelve experiments were made with the diluted acid on dogs, cats, and rabbits.

EXP. I.—A cat of moderate size was made to swallow twenty drops of the acid. It walked a few yards in a sluggish manner and then fell; in thirty seconds convulsions were observed, followed by slight emprosthotonos; the respirations were deep and slow, accompanied with a general trembling over the whole body. Before a minute had elapsed, the animal became insensible and motionless. The respirations were at long intervals; there were slight convulsions with an attempt to swallow, and urine was voided; the head was thrown backward; the animal ceased to breathe at the end of the second minute.

The chest was immediately opened, and the heart found contracting more feebly than natural. A vein in the vicinity was cut through, and no sooner had the blood poured out, than the contractions of the heart increased. As the blood flowed, these regular contractions became more active and forcible, until the end of the fifth minute, when the movements of the heart became irregular. At the tenth minute the ventricles were separated from the auricles and placed on the table; in two minutes, their contractions ceased, but the auricles left in connection with the blood-vessels continued to contract without the aid of a stimulus for at least four minutes after the ventricles had been removed. On pinching the brachial plexus with the forceps twenty minutes after the cessation of respiration, violent movements of the anterior extremities followed; the intercostal muscles contracted sometime after this even without the aid of a stimulus. The vermicular movements of the small intestines were observed an hour after the cessation of respiration.

EXP. II.—To a full-grown rabbit two drops were given. The animal was little affected, merely exhibiting a listlessness in its movements for a minute or so, and then recovered. Eight drops were now placed in the mouth, and in two minutes there was complete insensibility in all parts of the body with slight opisthotonos. This state continued for three minutes, when the hind-legs were observed to move, and the ears change in direction: in three minutes more apparent signs of recovery manifested themselves. The respiration and circulation were very little affected from the natural standard. Four drops were now thrown

* Dissertat. Inaug. Medic. de Venenatis Acidi Borussici in animalia effectibus, Tubingæ, 1805.
† Considerations Medicales sur l'Acide Prussique. Diss. Inaug. Paris, 1803.
‡ Beiträge zur Geschächte ver Blausaure.
§ Essai sur l'Acide Prussique, Strasbourg, 1813.
‖ M. Robert, Annales de Chimie, Tome xcii. Oct. 1814; M. Gazan, Essai sur les effets de l'Acide Prussique, Diss. Inaug. Paris, 1815; M. Callies, Essai sur l'Acide Prussique, Diss. Inaug. Paris, 1817.

upon the eye, he staggered, and the limbs were thrown into convulsions, and after two or three shrieks he became insensible. Respiration soon ceased; yet the heart was felt through the chest beating for two or three minutes with some slight irregularities.

In the remaining ten experiments the same phenomena were observed as related above. In some the heart was scarcely at all affected, whilst in others, the contractions were arrested within five minutes after the cessation of respiration.

From the above experiments it may be safely inferred that the diluted or medicinal acid does not kill by arresting the heart's movements, or, in other words, does not produce death in the way of syncope. Since it is obvious that this acid does not exert any special influence on the heart's action, we look for some other explanation of the cause of death, which fortunately soon suggests itself on a due observance of the symptoms. That it must act on the central organs of the nervous system, the brain and spinal cord, is fully shown by the convulsive movements, vertigo, tetanic spasms, loss of sensibility and volition. And that coma is also the result of this action is readily apparent from the fact, that the respiratory acts are performed slowly and imperfectly. It is believed, then, that death takes place in the way of coma from the respiration being ultimately arrested; and although the circulation continues for some minutes scarcely unaltered, the venous blood gradually becomes impeded in its passage through the lungs, and consequently the further progress of this fluid to and from the right side of the heart is suspended.

The numerous experiments of Coullon and those of Emmert, Ittner and Gazan, as quoted by Coullon,* agree with those I have related; and the symptoms induced in wolves, bears, and vultures, by poisonous doses of prussic acid, as experimented upon by Jæger,† resemble in every essential point those observed in dogs and rabbits.

The Dublin Committee of the British Association appointed to ascertain the causes of the sounds of the heart frequently made use of the prussic acid in their experiments,—a sufficient proof that the movements of the heart continued after the respiration had ceased.

The poisoning of a great number of dogs at the police office of this city in the summer of 1835, showed that the heart's action was very slightly affected, and never *directly* arrested in these animals by Scheele's prussic acid, but only *indirectly* from the suspended respiration and consequent stoppage of the circulation

* Coullon, Recherches et Considerations Medicales sur l'Acide Hydrocyanique, p. 130, et seq. Paris 1819.

† Journal Complementaire, Tom. xxvii. p. 330.



of the blood through the pulmonary tissues. The large dose of an ounce was sometimes given.

Magendie, who ranks among the first of the experimental physiologists on the continent of Europe, appears very satisfactorily, (although some authors seem to think otherwise,) to support the inferences which I have been led to deduce from my experiments. It is evident from the quotation * given below, that this physiologist must have been operating with a diluted acid, and, allowing that he has somewhat exaggerated the time, "plusieurs heures," during which he saw such curious phenomena exhibited by animals dosed with acid, the positive statements he has made regarding the respiration and circulation cannot be called in question. As Magendie has made no mention of the means employed by him to prove the complete extinction of irritability and contractility, I am inclined to think, from collateral circumstances, that he had contented himself with watching the respiration and circulation, the animal having lost sensibility and power of volition, as witnessed in many experiments which I might detail, where doubtless he might suppose, from the quiescent state of the extremities, that the voluntary muscles had lost all contractility. The respiration is said to have continued easy; now it must assuredly be admitted, that the movements necessary to respiration could not be carried on without the aid of muscular contraction.

Orfila has remarked in his Toxicology, that first the contractility of the voluntary muscles, then that of the heart and intestines, is annihilated immediately, or a short time after death. † This statement, so opposed to all my observations, demands some notice. Let it be remembered that M. Orfila has copied verbatim from Coullon, nor does he add one single observation of his own; and yet he has hastily written, "it results from what has preceded," (viz. Coullon's own words) "and other facts that the irritability of muscular fibre is destroyed." What these other facts were, we are not informed. Lest it should appear I am dealing too harshly with the writings of this deservedly great authority in toxicological science, I will do him all justice by copying from the 157th page of his work, the following paragraph, which is evidently taken from Coullon. ‡ "Inspection of the dead bodies shows that the muscular organs, especially the heart, and in the latter almost always the right auricle and ventricle, remain

* "En étudiant les phénomènes de l'empoissonement par l'acide prussique, j'ai souvent observé des animaux qui n'offrant plus de trace de sensibilité, ni de contractilité musculaire locomotrice, conservaient pendant plusieurs heures une respiration facile et une circulation en apparence intacte bien que très accélérée, et qui, pour ainsi dire, etaient morts par leur fonctions extérieurs et vivaient par leur fonctions nutritives." Magendie, Recherches Physiol. et Clinig. sur l'emploi de l'Acide Prussique, p. 8, or Annales de Chimie et Physique, Tom. vi. p. 351.

† Traité des Poisons, 3d ed. Tom ii. p. 165.

‡ Coullon, Recherches, &c. p. 146.

long irritable; and the intestines are long agitated by the peristaltic motion."

Dr Granville favoured the profession, some time ago, with a volume on the Prussic Acid, leaving us to judge of its strength, by informing us that it was made at Gardens, in Oxford Street. It can only be inferred from the doses and medicinal use, that it was the diluted acid; yet how does he describe its action? "If the dose be large, and the animal in the full enjoyment of health and strength at the time of taking the acid, a sudden cessation of vitality takes place, quicker than thought can imagine, or words describe. It is as sudden as the cessation of motion in a watch when the finger is applied to the balance—yet none of the machinery is put out of order! No convulsions follow."* The statement, that there are no convulsions is, as far as I am aware, without a parallel in the history of the acid, and in no case of my observation was the animal free from convulsions. But Dr Granville in the succeeding sentence writes, "In some instances the animal whirls round once," which certainly implies something like disorder in the "machinery." It would be unprofitable to proceed further with Dr Granville's account of the physiological action of the acid, as the highly figurative language in which his expressions are couched, render them quite inapplicable to the purposes of a scientific paper.

2. Two experiments were made with the 12 per cent. acid.

An aged bitch swallowed twenty drops, and ceased to breathe within the minute. A large dog formed the subject of the second experiment. An ounce was poured down his throat: the contents of the bottle were scarcely emptied, when the animal cried out and experienced convulsions, and in less than twenty-five seconds respiration had ceased. The heart of both animals contracted regularly for three minutes. Allowing the blood to escape from the *vena cava*, renewed the contractions some time after respiration had ceased, in the first experiment, so late as the fifteenth minute. In the second experiment the heart was more decidedly affected.

It may be well to notice here the experiments of Schubarth, which have been reported by some of our British authors as showing that the contractility of the heart is destroyed by the hydrocyanic acid. The experiments, eleven in number, were made with Ittner's acid, which contains 10 per cent. of the pure acid. It is certainly true that Schubarth has in one place stated that the irritability of the heart is destroyed,† but on contrasting this with

* Granville, Historical and Practical Treatise on the Hydrocyanic Acid, 2d edit. p. 86.

† Bemerkungen über die Wirkungen der Blausäure. Hufeland's Journal der Praktischen Heilkunde, lii. i. p. 83.



other remarks by the author, in the same paper, on the manner in which certain symptoms were developed, and death followed the administration of the poison, I am inclined to suppose that he has expressed himself too hastily in the passage to which we refer. For in page 77, he says, "if the animals die slowly, the first symptoms, after from fifteen to twenty seconds, were giddiness, then the breathing and action of the heart became exceedingly hurried." In a foot-note to the same page it is remarked, that in all cases the breathing or play of the lungs first ceased, then the heart moved for a short time, and when this ceased, there continued for a quarter of an hour an involuntary contraction of the muscles on exposing them, and peristaltic movements of the small intestines. And in alluding to the experiments where the dose was sufficient to cause immediate death, in which giddiness directly followed the administration of the acid; and the animals fell down senseless, had tetanic spasms, often gave a short but piercing cry, and then died, he writes, "Respiration completely ceased after from two to three minutes; the heart beat violently and convulsively about from four to sixteen minutes; and all signs of life then ceased."* Now, if the heart was primarily acted upon, as is stated in page 83, what are we to infer from the paragraph just quoted, in which we are told that the heart was acting violently and convulsively for two or three minutes after respiration had ceased?

As the diluted acid is that which concerns the practitioner and the toxicologist, it would be unnecessary to make experiments with the concentrated acid, were they only to prove its fearful activity as a poison. It is, however, in reference to the action of the pure acid that so much altercation has arisen between British and foreign authors, and further experiments therefore seem necessary.

Magendie remarks of the pure acid, "that its activity is truly frightful, even to persons accustomed to observe the effects of poisons."† In support of this statement he relates the following experiment. A drop of the acid diluted with four drops of alcohol having been injected into the jugular vein of a dog, the animal "instantly dropped down dead as if he had been shot or struck by lightning."‡ In a preceding experiment he says it was impossible to find in the "locomotive" muscular organs any trace of irritability. May not Magendie in these experiments have taken the same test to prove the presence of irritability as in the numerous cases where he administered the diluted acid? Indeed,

* Bemerkungen, &c. Hufeland's Journal, lii. i. p. 79.

† Recherch. Physiol. et Clin. p. 4. or Ann. de Chim. et Phys. vi. p. 349.

‡ The expressions "quick as thought," frappe de la foudre, &c. &c. have of late become fashionable terms in medical literature. Such phraseology seems more adapted to astonish the vulgar, than to throw light on physiological phenomena.

he admits in a foot-note written after the Memoir had been read to the Academy of Sciences, that he had frequently seen traces of irritability in animals poisoned by the pure acid. Nowhere in the memoir do I find this physiologist mention the effects of the acid on the heart, and Coullon concluded from a great number of experiments that the effects of the acid of Gay-Lussac in small quantities are similar to those obtained by a large dose of Scheele's acid.* M. Robert's experiments† merely point out the rapidity with which animals die when exposed to the vapour of the acid.

We give Dr Christison's experiments in his own words. "In eight experiments on cats and rabbits with the pure acid, the heart contracted spontaneously, as well as under stimuli for sometime after death, except in the instance of a rabbit killed with twenty-five grains, and one of the cats killed by three drops applied to the tongue. In the last two, the pulsation of the heart ceased with the short fit of tetanus which preceded death; and in the rabbit, whose chest was laid open instantly after death, the heart was gorged, and its irritability utterly extinct."‡

Large doses of the diluted acid appear to act as rapidly as smaller doses of the pure acid, as the experiments of Macaulay and others at Leicester prove.§

3. The acid I employed in the third class of experiments was made according to Gay-Lussac's method; by decomposing bicyanide of mercury with hydrochloric acid. The beak of the retort contained fused chloride of calcium and dry carbonate of lime: the receiver was kept quite cool. On Mr Kemp's authority the acid so prepared was perfectly anhydrous.

Exp. I.—Twenty drops were given to a middle sized cat. The animal jumped off the table, cried out, and became convulsed: opisthotonos succeeded, and the respiratory movements ceased within ten seconds. On opening the chest, the heart was observed to act more feebly than in the experiments with the diluted acid. Opening one of the large veins in the vicinity of the heart renewed its contractions. The voluntary muscles and intestines retained their contractility for several minutes.

Exp. II—VIII.—Three rabbits and four cats were poisoned by doses of from twenty to thirty drops of the same acid. These eight experiments with the strong acid offered the same results; the symptoms bearing the closest analogy to those observed to follow the administration of the dilute acid, with the exception of its acting

* Coullon, Recherches, &c. p. 207.
† Annales de Chimie et Physique, xcii. p. 98.
‡ Christison on Poisons, third edit. p. 697.
§ London Medical Gazette, viii. p. 797.



more energetically on the heart in these last experiments. Being satisfied that the pure acid administered by the mouth, even in doses of twenty drops, though it enfeeble, does not destroy the irritability of the heart or voluntary muscles. I resolved to inject it into the trachea.

Exp. IX.—Having exposed the trachea in the middle of the neck of a young rabbit, and made an opening sufficiently large to admit the point of a syringe; nearly a drachm of the pure acid was injected. Before the syringe could be withdrawn the animal was affected with convulsions, which cast him with force from the table (3 feet high) upon which he was placed at the commencement of the experiment. He ceased to breathe at the seventh second. On exposing the chest, which was done very rapidly, the heart was seen enormously gorged on its right side, not so much so on the left. With great confidence in the renewal of its contractions by relieving the distension, I punctured the superior *vena cava*; the blood spouted forth with considerable force, but there was no movement of the heart, not even of its right auricle, nor could any be excited on the application of a feeble degree of galvanism.

Before attempting to explain the cause of deviation in the phenomena observed in this experiment, from those already related, I beg to offer, with due deference to the authority of Magendie, my humble opinion, that no poison, however powerful, could act more rapidly, than the hydrocyanic acid did in this case; as is sufficiently proved by the fact, which was observed by all present, that the rabbit was under its influence before the syringe was emptied of its contents. Notwithstanding this almost instantaneous action of the acid upon the nervous system, as indicated by convulsions, &c. the respiratory movements did not cease before the seventh second, and I am at a loss to understand how death could follow within a second of the administration of a single drop of the same acid.

Fom the sudden fall on the floor which the animal suffered, it appeared probable that the brain had suffered concussion, and thus influenced the contractility of the heart; but in a second experiment, where the animal was held firmly on the table, and twenty drops thrown into its trachea, the same result followed, therefore the annihilation of the contractile property of the heart in these cases, may be fairly attributed to the effects of the acid. The only explanation that can be given, for the more destructive ageney of the acid when thrown into the trachea, appears to me to rest on anatomical grounds. Since the epithelium, which lines the cavity of the mouth, extending along the gullet, and terminating in the human species at the cardiac orifice of the sto-

mach, must be considered like the epidermis, an inorganic layer lying between the minute ramifications of blood-vessels, lymphatics, and nerves distributed on the mucous membrane, and the substance applied to these membranes, it is obvious that the action of the acid must be much more rapid when applied on the mucous membrane of the lungs, where, if the epithelium exists at all, it is so thin as not to be recognized by our senses, than when applied to such a membrane as that of the mouth.* The extreme thinness and great extent of the membrane which lines the minuter ramifications of the bronchial tubes, over the surface of which the acid must be rapidly spread on the first inspiration of the animal, affords another reason for its more powerful action. It is also possible, that the acid may be carried directly from the lungs, by the pulmonary veins, to the inner surface of the heart, and thus destroy its irritability.†

With a view to determine the quantity of acid which, thrown into the trachea, destroys the contractility of the heart, I poisoned two cats, three rabbits, and a dog with doses varying from one to fifteen drops. From these experiments, it appeared that any dose beyond ten drops injected into the trachea, will so influence the contractility of the heart as to suppress its movements within a minute. In some of these experiments we had an opportunity of testing in another way the effect of the strong acid on the system. On exposing the interior of the chest, the blood in the left cavity of the heart was observed to be imperfectly arterialized, and very shortly became quite venous. The venous blood now circulated in the system as well as the pulmonic heart. Whereas in those cases where the acid was thrown into the trachea, and the movements of the heart completely arrested, the left chambers of the heart contained purely arterial blood, and no change was observed to take place in its colour.

In imitation of Magendie's experiment, I made the following experiment. One drachm of 3 per cent. acid was injected into the jugular vein of a large-sized dog towards the heart, care being taken to prevent any loss of blood. The respiration ceased within a minute, but the heart continued to beat against the ribs for three minutes, and some time after this we observed its feeble movements.

What deduction, then, ought to be drawn from these experiments made with the strong acid? The experiments exceed in number, so far as I am aware, those performed by any single experimentalist in this country, and are, I hope, amply sufficient to enable us to arrive at some satisfactory conclusions, as to the action of this powerful substance on the animal economy. The accession of vertigo and convulsive action of the extremities, while the movements of the heart continue with a greater or less degree of regularity, distinctly show that the brain and spinal cord are directly affected. The diluted acid, as has already been shown, has an influence on the heart's action; but that exerted by the strong acid, as might be anticipated, is more marked and powerful. It must be distinctly understood, that when it is stated that the heart is affected, it is at the same time maintained, that the more direct action of the acid is on the sensorial functions. That the heart should be influenced, is not surprising when we remember its close connection with the central organs of the nervous system, and the facility with which its functions are disturbed by causes acting directly on the brain, as exemplified by the phenomena attending concussion.

We do not expect any necroscopic appearances to prove a local influence of the acid on the brain, an organ which can only be affected from nervous or vascular connection with the part to which the poison is applied. It may also be remarked that, in some cases of simple apoplexy and other diseases terminating suddenly, in certain forms of jaundice, and *ischuria renalis*, where the bile and urea are not eliminated at their respective organs, but remain in, and are carried along with, the blood to the brain, and there act as poisons, exciting convulsions and coma, symptoms similar to those which follow the administration of the hydrocyanic acid, we find nothing on dissection indicating any disease of the cerebro-spinal axis.

Dr Christison states, with regard to two experiments which he performed, where the acid was given by the mouth in large doses, and destroyed the contractility of the heart, at the same moment that he believes idiosyncrasy may affect the results. As a farther explanation of these cases, I am inclined to add, what appears extremely probable, that some of the vapour of the poison was drawn into the lungs during a sudden inspiration of the animal.

From a careful review of the preceding facts, I am constrained to believe, that the immediate effects of the anhydrous acid are exerted on the brain and spinal cord, and that it also indirectly enfeebles, to a greater or less extent, the contractility of the heart. Cases may occasionally be met with (but I feel assured that they will be few in number) which may lead an experimenter to doubt the accuracy of my conclusions; but I think

* Whether the acid produces its poisonous effects on the system by acting on the nerves of the part, or from being carried into the circulation, matters not in regard to this explanation; for whatever favours the one, is no less favourable to the other, as the same inorganic membrane which covers the blood-vessels and retards absorption must also prevent its application to the expanded extremities of the nerves.

† This is further confirmed by our observing that the contractility of the voluntary muscles and intestines are not more affected in these cases than where the dilute acid was given.

I may venture to say, that, if he performs as great a number of experiments with the substance as I have done, he will be satisfied that such instances are rare, and must be ascribed to individual idiosyncrasy.

II. *Is Hydrocyanic Acid a Cumulative Poison?*—An interesting question connected with the physiological action of every poisonous agent is to ascertain whether it possesses a cumulative property, that is to say, whether, when taken for a certain length of time in small or medicinal doses, and without manifesting any morbid action, its toxicological effects may suddenly become developed, as is well known to be the case with some substances, *e. g.* mercury and digitalis.

A case is related by Dr Baumgärtner of Freyburgh, which is looked upon as illustrative of the cumulative power of the hydrocyanic acid. A man who had been taking ten drops of Ittner's acid daily, for a period of two months, without any poisonous effects being developed, was found one morning labouring under all the symptoms of poisoning with the acid. Tetanus and coma supervened. Venesection seemed to relieve the spasms and remove the tendency to delirium, but more than thirty hours elapsed before he recovered his sight.* The duration of the symptoms along with other circumstances render the case equivocal in reference to the subject under consideration, and the most probable explanation is, that the person had taken a larger dose than usual. It has been remarked by Dr Graves, that leeches soon perished when applied to the epigastrium of a person who had for some time previously been taking the hydrocyanic acid.† Such an occurrence, however, is no proof of the acid being the deleterious agent; for how often do these animals die when applied to the human skin, without our being able to discover the cause?

The great volatility of hydrocyanic acid is a property incompatible, in my opinion, with the power of accumulating in the system. For as the acid is absorbed into the circulation, it must soon arrive at the lungs, where, from the extreme tenuity of the membrane separating the blood in the serous capillaries from the air filling the pulmonary cells, it must escape from the body along with the carbonic acid in the expired air. This opinion, naturally adopted on theoretical grounds, is amply confirmed by experiment. In animals which lived some minutes after a fatal dose had been given, the air forced out from the lungs during the violent respiratory movements was so strongly impregnated with the odour of the acid, as to be perceived a few inches from the mouth of the animal; and from the odour being only sensible during

* Medizinisch-Chirurgische, Zeitung, i. 377. Quoted by Christison, p. 703.
† London Medical Gazette, xiv. p. 583.



expiration, it evidently did not depend on the state of the mouth. This statement was frequently verified, and many of my friends can bear testimony to its correctness. Moreover the same phenomenon has been observed in at least one individual of the human species poisoned by the prussic acid.*

That Baumgärtner's case is to be viewed as a casualty, seems obvious on the following grounds. It was not at all uncommon in Magendie's practice to administer the diluted acid for a period of two months and even longer without the appearance of any bad symptoms. The same might be said of many cases treated by British practitioners; and certainly the Italian professors would have observed cases evincing a cumulative property from the large and frequently repeated doses they have prescribed, had the substance possessed any such property.

### III. *Medico-Legal Questions.*

After an elucidation of the physiological effects of the hydrocyanic acid, it seems necessary to allude, however briefly, to those circumstances which bear most directly upon legal medicine.

The examination of a medical jurist in a case of poisoning with this substance may be resolved into three questions; 1. What time elapses between the taking of the prussic acid and the first appearance of untoward symptoms? 2. Within what period does this poison prove fatal? 3. Are the symptoms induced in man by a poisonous dose of prussic acid always uniform and characteristic?†

Since the previous habits and idiosyncrasy of the individual,—the state of the stomach in regard to quantity and quality of contents, are all circumstances tending to modify the poisonous agency

* The case alluded to in the text is exceedingly interesting, as showing the successive stages of the symptoms produced by a dose, which, although large, was not destructive of life. Dr B. of Rennes took two teaspoonfuls of Vanquelin's acid:—in a few seconds he felt as if thunderstruck. An apothecary administered ammonia, but in small quantity, as the teeth were closed. The first symptoms were, insensibility, trismus, with noisy and rattling respiration, cold extremities, distortion of the mouth, and the exhalation of an odour of bitter almonds, small pulse, countenance and neck bloated and swelled, pupils fixed and dilated, in short, the state of an apoplectic about to die. He continued in this state for two hours and a half, at the end of which time his senses returned and he uttered, "J'ai pris de l'acide prussique, donnez-moi de l'air et laissez moi mourir." He then asked for coffee, but the irritable and ulcerated state of his mouth would not allow him to take it. A purgative lavement was administered, which produced five or six evacuations: at each evacuation by stool a quantity of gas, having the odour of the acid, was discharged from his mouth. No symptoms of paralysis. (Revue Medicale, 1825, i. 265.)

† This question has been entirely overlooked by English and foreign authors, (Beck, Christison, and others.) Its importance, however, is strikingly illustrated in the trial of Captain Donnelan for the murder of Sir Theodosius Boughton in the county of Warwick, England. The evidence of the late John Hunter is more particularly deserving of attention, for an abstract of which, vide Beck's Med. Jurisprud. 5th ed. p. 897.

of the hydrocyanic acid, it is impossible to lay down general conclusions on the first of these questions. From a careful calculation of the ages, weight, &c. of several animals, and the doses administered to them as compared with man, I think it probable that a drachm of Scheele's acid would affect an ordinary adult within the minute, and a dose exceeding this, suppose three or four drachms, would exert its influence within ten or fifteen seconds. When the acid is stronger, and the quantity larger, we are pretty certain of its immediate action and consequent annihilation of the sensorial functions.

2. As to the time at which the acid proves fatal? There are records of cases of the human species poisoned by the prussic acid where death occurred as early as the second minute, and as late as the forty-fifth minute. Should proper measures be adopted for the recovery of those poisoned, it seems probable that those who survive the fifteenth minute may recover. Most physicians will agree with me in thinking that the Parisian epileptics, if properly attended to, would have lived; and it deserves remark, that a smaller dose than that which they took is not likely to prove fatal. The dose amounted to 20 drops of the medicinal acid, which, allowing the acid to be of 3½ per cent. strength, would contain about two-thirds of a grain of pure acid.*

3. What symptoms are characteristic? The loss of consciousness and voluntary motion, the slow, deep, and heaving respiratory movements, whilst the circulation gradually becomes enfeebled, the fixed and insensible iris, in short, all the characteristics of apoplexy, were observed in the lower animals, and the same were observed in the physician at Rennes. It is far from improbable that a person may have a dose of prussic acid given him, so proportioned as to induce a simulated apoplexy, which, if the medical man was unaware of the cause, might be mistaken for the real disease. For it must be remembered that when doses not rapidly fatal are administered, the convulsions and tetanic spasms soon subside, and the animal lies in the apoplectic state for some time. So far then there is some difficulty in the way, and a knowledge of the general symptoms would be inadequate. But there is one circumstance which has received no attention from medico-legal writers, and that is the exhalation by the breath of the acid vapour. This has been observed in the human species, and numerous animals experimented upon by me, as already mentioned, and certainly would be sufficiently characteristic of the poison having been taken.

After a due attention to the symptoms, and the time and mode

* Dr Geoghegan (Dublin Journal of Med. Science, Vol. viii. p. 309,) relates a case of poisoning, where about the same dose was taken, yet, by the application of remedial agents, the person recovered.



in which death takes place, it becomes necessary to detect by chemical analysis the presence of the noxious agent introduced into the animal economy. The small quantity of hydrocyanic acid necessary to prove destructive, its great volatility in an uncombined state, and facility of decomposition by substances with which it may come in contact in the stomach, are circumstances which have been, and always will be, great obstacles in the way of proving its presence.

Much attention has been paid to the chemical means of detecting the presence of the hydrocyanic acid. The experiments of Leuret and Lassaigne are the most extensive. They found that in animals poisoned by small doses of the prussic acid it was not possible to demonstrate it by chemical means, after three days of exposure to the air after death.* Krimer states that he found the acid in the blood of an animal which died in 36 seconds.†

My chemical examination of the blood, brain, and contents of the stomach, according to the method recommended by Leuret and Lassaigne, leads to the following conclusion:—that from the fourth to the eighth day after death, although the odour is sufficiently strong so as not to be mistaken, yet careful distillation and the usual tests fail to prove the presence of the acid in animals which have been kept in the apartment where they were poisoned. These results coincide with what has been observed by Leuret and Lassaigne, who state that, when there was a strong odour of the acid in the brain and chest, they could not succeed in proving the presence of the acid by chemical analysis.‡ The odour was very considerable in the contents of a stomach examined by Dr Turner, yet the quantity obtained by chemical analysis was very minute. § The person had taken a strong dose of the acid. In Chevallier's case, however, the poison was detected as late as the seventh day, although the trunk of the body had never been buried, but found lying in a drain.‖ Gazan and Vauquelin state that the odour is sufficiently sensible in the stomach, although they could find no trace of the acid.¶

Various are the opinions which toxicologists have formed of the continuation of the odour after death. Magendie states that it is distinct for "several days."** Schubarth†† observed the odour to be distinct in the blood, heart, lungs, and cavities of the brain for several hours after death, provided the animal died within from

* Journal de Chim. Med. ii. 561.

† Journal Complement. xxviii. 10th experiment. I observe in the fourth conclusion which Krimer has evidently drawn from this experiment, that minutes are used instead of seconds, which we give in the text. It deserves mention that Krimer distilled the blood to dryness.

‡ Annales d'Hygiene, Publ. iv. 422.

§ Elements of Chemistry, 5th ed. p. 428. ‖ Annales d'Hygiene Publ. ix. 337.

¶ Coullon, Recherches, &c. p. 135. ** Magendie's Memoire, p. 6-7.

†† Bemerkungen, &c. p. 84, 88.

four to ten minutes. When the dose was so small as not to cause immediate death, it was found that not only a few hours after death, but almost immediately afterwards, no trace of the prussic acid could be found in the above-mentioned parts, viz. stomach, lungs, and brain. A horse died in thirty-two minutes. The dissection was made immediately after death, but no odour was distinguished.

Schubarth's experiments appear to show that, if life is prolonged beyond fifteen minutes after the poison is taken, we need not look for the odour. The bodies of the Parisian epileptics are said to have emitted no odour, which fact is seemingly in favour of Schubarth's statements. There can be no doubt that, if the animal survive some time after the administration of the poison, the acid may escape by the lungs or some of the excretions; but the data we possess at present on this point are insufficient to enable us to determine the time at which this may take place. It must, however, be remembered that Schubarth's dissections were made where there was a free current of air; indeed, he seems sensible of the fallacy arising from this source, by wishing to avoid such circumstances in future experiments. The temperature, situation, and exposure to which the body is subject during life and after death, require to be carefully considered as modifying the results.

With the view of ascertaining the duration of the odour after death, I caused several animals which had been poisoned by the acid to be kept in a room at the temperature of 50° Fahrenheit, during seventeen hours of the day, and others to be buried in light garden soil six inches below the surface. The results of these experiments (fifteen in number,) which were tested by at least three individuals in each case, lead me to expect the odour as late as the eighth or ninth day after death, even where life is prolonged to the eighth minute after a dose of the hydrocyanic acid.*

It has been stated by Coullon that animals poisoned by the prussic acid resist putrefaction. Emmert is of the same opinion.† Leuret and Lassaigne state that, on the exhumation of bodies (dogs and cats,) fifteen days after death, and even at the end of a month, putrefaction had not made very rapid progress.‡ The examination of human bodies and the fluid state of the blood in many cases reported by Coullon himself, do not support those who maintain the antiseptic powers of the acid. As it can only be by an extensive series of experiments that we can arrive at

* From a review of the experiments alluded to above, I certainly believe that the odour is much less distinct where death is protracted for a few minutes, than where it immediately follows the exhibition of the poison, which to a certain extent corroborates the opinions of Schubarth. However, it was sufficiently sensible for at least twenty-four hours even in the case of a dog which lived twenty-five minutes, and in several others which lived a shorter time for four or five days.

† Coullon, Recherches, &c. p. 153. ‡ Journal de Chim. Medic. ii. 561.



any thing satisfactory on this head, I refrain, for the present, from giving place to my limited observations.

IV. *On the Treatment of Poisoning with Hydrocyanic Acid.*—Impressed with the terrible rapidity with which hydrocyanic acid acts as a poison, many have argued that it is vain to think of antidotes, or any treatment that may be advised, proving sufficient to counteract its baneful agency upon the system. But several cases might be adduced where the action of the acid was more slow, and where sufficient time intervened between the exhibition of the poison and the fatal result to admit of the trial of restorative means. It is obvious from the nature of the poison that no remedial measures can be expected to prove beneficial unless they are energetic, and promptly had recourse to.

Ammonia is the antidote most generally recommended. Dr Mead appears to have been the first to observe its good effects.* Plenck ranks the *spiritus salis ammoniaci* amongst his antidotes to the cherry-laurel.† But the experiments which have led to its adoption as an antidote are those of Mr Murray and Professor Buchner. A dose of prussic acid, which killed one rabbit in ten minutes, was given to another, at the same time that ammonia was applied to the mouth on a sponge. The animal experienced no bad effects. From these and other experiments Mr Murray offered to take a fatal dose, provided some one stood by to administer the remedy.‡ Experiments made with prussic acid on a cat, spiders, and flies induced Buchner to believe that ammonia was useful in restoring them from the convulsive stage.§ Fremy‖ and Dupuy¶ confirmed these experiments. Orfila formerly looked upon ammonia and all antidotes to the prussic acid as useless; more lately, however, he has made experiments, which are similar in result to those of Murray. Dr Herbst, whose experiments with the cold affusion will be presently noticed, says, ammonia ceases to be of service after the first doses, and is only useful in the first stage of symptoms or convulsions. From three experiments I have witnessed, I am inclined to support Dr Herbst in his opinion.

It is to be remembered that ammonia itself is an active poison, exciting inflammation of the Schneiderian membrane, in some

* Mead's Medical Works, p. 131.

† Plenck, Toxicologie, 2d ed. p. 97. Vienna, 1801.

‡ Edin. Philosoph. Journal, viii. 124. Mr Murray supposed the hydrocyanate of ammonia to be inert, hence his strong recommendation of this antidote. The experiments of Schubarth have shown that this opinion is incorrect, as the hydrocyanate of ammonia is scarcely less active than the prussic acid itself.

§ Buchner's Repertorium für die Pharm. xii. p. 145–6.

‖ Journ. de Chim. Med. i. 402. ¶ Ibid. ii. 356.

cases causing bronchitis, and even death. A good illustration of its pernicious effects even when used as an antidote is to be found in the case of a physician at Rennes, * who laboured under inflammation and ulceration of the mouth for several days after recovering from the effects of the prussic acid. Such instances may well lead us to ask whether the poison or the antidote is more to be dreaded.

Chlorine was first proposed as an antidote by Riauz, a chemist at Ulm, in the year 1822, who rested his recommendation on a single experiment made on a pigeon. Buchner confirmed Riauz's experiment.† MM. Simeon and Dauvergne,‡ at the Hospital of St Louis, have also advised the use of chlorine. MM. Persoz and Nouat have been anxious to prove that the chlorine was absorbed into the circulating system, and there reacted on the hydrocyanic acid. § Orfila deems this remedy the most powerful antidote we possess.‖

If animals live to the fifteenth minute (as in the experiments related by Orfila, which are alone worthy of attention,) after a poisonous dose, it is probable that stimulants of a much milder nature may restore the animal to health, or, perhaps, in some instances, even spontaneous recovery might take place. Chlorine like ammonia is highly poisonous when used incautiously. Were this substance really an antidote, it would seldom be within reach in cases of emergency.

The cold affusion has been strongly recommended by Dr Herbst of Gottingen.¶ His experiments appear to show the good effects of this practice during the "spasmodic period" of the symptoms. Dr Herbst believes that the effects of the acid, even when introduced into the organism in quantity more than sufficient to produce death, may be combated with success by affusions of cold water upon the body generally. Orfila speaks favourably of the cold affusion, but considers it to be inferior to chlorine. Dr Banks relates the case of a young girl (aged nineteen) who took forty drops of dilute prussic acid, and fell into a state of insensibility and convulsions. Stimulants were useless, but cold water poured from a pitcher on the head restored her to sensibility.**

From these experiments it appears that the cold affusion is a useful remedy in cases of poisoning with prussic acid. It certainly possesses advantages which few antidotes can boast of, viz. that of being always at hand and readily applied.

* Revue Medicale. 1825, t. 265.
† Buchner, Repertorium für die Pharm. xii. 141.
‡ Journ. de Chim. Med. v. 406.
§ Anal. de Chim. et de Phys. xliii. p. 324.
‖ Annal. d'Hygiene Public. Tom. i. p. 525.
¶ Archiv. für Anatomie und Physiologie, 1828, p. 208, or Journal Complement. xxxiii. p. 13.
** Edin. Med. and Surg. Journal, July 1837.



Various antidotes have been recommended in addition to those just detailed. Ittner and M. Chancel* rely on the sulphate of iron united to potass. Oil of turpentine, introduced as an antidote by Emmert,† and at one time supported by Orfila, has been shown by the experiments of Coullon‡ to be quite inefficacious.

Though the value of those remedies commonly advised has been considered at some length, I am strongly impressed with the belief that an important part of the treatment of such cases still remains to be noticed. Looking at the mode in which death takes place,—the continuation of the heart's action for a short time after the respiration has ceased,—the gradually increasing distension of the right side of the heart by venous blood, and then the final arrestment of the movements of this organ;—the renewal of the contractions of the pulmonic heart after the withdrawal of a small quantity of blood from its auricle, are all circumstances of the utmost importance, as suggesting the principles of treatment It has already been stated, that the acid, although having a direct influence on the central organs of the nervous system, also affects the contractility of the heart, and that this effect on this organ varied from a slight diminution to complete suspension of its contractility, according to the amount of the dose and other circumstances. In those cases in which coma is induced, without much, if any diminution in the contractile power of the heart, the blood, notwithstanding, becomes congested in the right side of that organ, from the imperfect manner in which it is transmitted through the lungs, as occurs in all cases where the respiratory movements are imperfectly performed: bleeding from the jugular, by relieving the engorged state of the right side of the heart, may be expected to favour the remedial agent, such as dashing cold water upon the face, applying ammonia to the nostrils, &c. employed to revive the patient and cause him to breathe. It also appears that when the effects of the acid upon the heart are transitory, and produce only a temporary diminution of its contractility, the right side of the heart becomes engorged during the partial suspension of its movements, and that when it would renew its usual contractions, it is prevented from doing so by the mechanical distension of its walls. By opening the jugular, in these circumstances, we may hope to relieve the engorgement of the right side of the heart, and thus materially favour the renewal of its contractions. It needs no remark, that in those cases where the

* Dictionnaire des Scien. Médic. Tome xlv. p. 573.
† Buchner, Repertorium fur die Pharm. xii. 143.
‡ Coullon, Recherches, &c. p. 255.

acid acts with sufficient energy to arrest primarily the contractility of the heart, all remedial agents will be applied in vain.

I have often observed that the puncturing of the subclavian vein in the lower animals had the desired effect, and am therefore led, *à priori*, to believe, that the opening of the jugular vein in the human subject will serve the same purpose,—that of unloading the right side of the heart. But Haller has shown by experiment which was afterwards confirmed by Spallanzani, that the right side of the heart could be emptied of its blood by opening the jugular vein. This was attributed by Haller entirely to the derivation of blood, as is observed in the flow of this fluid from vessels opened at a great distance from the heart. These experiments of Haller have been more fully illustrated by my friend, Dr John Reid, in the 127th number of the Edinburgh Medical and Surgical Journal. He is of opinion that the flow of blood from the lower orifice of the jugular vein depends on the contraction of the right side of the heart; but in cases where the heart is extremely congested, he believes the derivation of Haller to come first into operation. Connecting Dr Reid's observations with what I have witnessed in thirty experiments, there appears little doubt in my mind as to the mode of proceeding in cases of poisoning with hydrocyanic acid. But as in practice we must be governed by more than theoretical opinions, experiments were instituted to ascertain the value of bleeding from the jugular vein. Before detailing these, it may be well to notice the opinions of authors. Hume observed that bleeding was useful in "relieving the violent symptoms" in a dog poisoned by the acid under consideration. Of its *modus operandi* we are not informed. Orfila repeated Hume's experiments, but without success.* Dr Paris says, "bleeding seems a decidedly fatal measure;"† while Dr Christison remarks, that "venesection is probably indicated by the signs of congestion in the head."‡ The discrepancy of opinion stated by the above authorities appears to be attributable to the want of physiological data.

Exp. I.—A ligature was passed around the left jugular vein of a small, lean dog, of the bull-terrier breed, five months old. The animal was made to swallow ten drops of prussic acid, § he became violently affected before the thirtieth second, and in ten seconds more there was complete tetanic rigidity of the whole body, with expulsion of the urine. As these two symptoms were very generally observed to be the immediate precursors of death, the jugular was now freely opened, and the blood flowed in a forcible stream to the extent of two ounces, when it was stopped.

* Orfila, Toxicolog. General. 3d. ed. ii. 107.
† Paris and Fonblanque, Med. Jurisprud. ii. 406-7.
‡ Christison on Poisons, 3d ed. p. 715.
§ The acid employed in this experiment contained 4¼ per cent. of the anhydrous.



As the ligature had been drawn tight before the vein was opened, the blood could only come from the larger venous trunks leading directly to the right side of the heart. After the bleeding, we felt more distinct contractions of the heart, and the respiration returned. In three minutes the respiration became more active, and there were some signs of returning sensibility. In ten minutes his state resembled that of drunkenness. Before the twenty-fifth minute he walked across the room; and in half an hour he was perfectly recovered.

In this remarkable experiment there was realized more than my most sanguine reliance on the treatment by venesection had ever anticipated. The dose, as proved by previous experiments, would have produced death in two, or at the farthest three minutes after being taken. That bleeding in this experiment was not beneficial by relieving cerebral congestion is quite apparent, because the ligature on the vein prevented the return of blood from this quarter.

In a second experiment, where a ligature was also placed on the jugular vein as in the previous experiment, bleeding was equally successful. It was observed in a third experiment where the dose of the acid was so large as to preclude all hopes of recovery, that bleeding from the jugular vein prolonged life, and thus afforded time for the application of other remedial agents.

The following experiment was made by Drs J. Reid and Duncan, and Mr Spence. To a large sized dog, a strong dose of diluted acid was given. The animal was soon affected with convulsions, which continued for two or three minutes, and he was apparently dying. The cold affusion had little or no effect. The external jugular vein was now opened, and the blood had scarcely commenced flowing, when the convulsive movements began to diminish, and continued to diminish rapidly, during the flow of the blood from the vein. After losing a few ounces of blood the animal recovered.

Dr J. R. Cormack has detailed a similar experiment, in which the effects of relieving the distension of the heart are strikingly illustrated. After the acid was administered the animal seemed to be in the agonies of death, but whenever the jugular vein was opened it began to revive, and seemed quite well at the end of an hour.*

From these experiments, I feel no hesitation in saying, what might indeed be inferred *à priori*, from an acquaintance with the physiological action of the poison, that bleeding from the jugular vein is of essential service in the treatment of poisoning with hydrocyanic acid. It evidently acts by unloading the congested cavities of the right side of the heart, which enables this viscus to renew its contractions until the coma subsides.

The following case, related by Magendie, is further confirmation

* Cormack's Prize Thesis, On Air in the Organ of Circulation, p. 38, Edin. 1837. Dr C. has, in his Treatise on Creosote, (pp. 84 and 92, Edin. 1836,) mentioned analogous experiments in which creosote was the deleterious agent employed.

of the utility of bleeding from the jugular vein. A young lady, eighteen years of age, through the neglect of her physician, swallowed a large dose of an extemporaneous mixture containing prussic acid. A few minutes afterwards, she was seen by Magendie, who found her labouring under drowsiness, convulsions, and "cerebral congestion." A large quantity of blood was abstracted from the jugular vein, and several drops of ammonia diluted with water were administered: these measures were followed by a sensible amelioration; consciousness and tranquillity returned.*

In my opinion, the relief of cerebral congestion was not what proved of advantage, for when a ligature was placed above the opening of the vein, as in two of our experiments, benefit resulted. There cannot however be the slightest doubt that bleeding is rendered still more efficacious by allowing some blood to come from the head.

V. *Therapeutical Properties of the Hydrocyanic Acid.*—To enter upon an historical account of the hydrocyanic acid as a therapeutic agent would serve no beneficial purpose. I shall therefore proceed to notice those diseases in which it has been recommended or found useful.

1. The practice of administering prussic acid in the diseases included in the order "Febres" seems entirely confined to the physicians of Italy, who recommend it on the same principle as the tartrate of antimony, viz. as a contra-stimulant. No one in this country, as far as I am aware, has adopted the Italian practice. From repeated trials of the medicine in hectic fever, Dr Granville speaks favourably. †

2. Professor Brera extols the acid in pneumonia, and it is probable that the large doses (above forty drops in the day) which he prescribed, might so far impair the sensibility as to "calm the movements of the heart and diminish febrile irritation." ‡ Dr Caspari recommends its use in the *phlegmasiæ* of the mucous membranes and glandular organs. He also relates several cases of puerperal peritonitis, cured by small doses of Ittner's acid every hour. § Cases of metritis are reported by Plattner, Dall' Oste, and Granville, as having been treated successfully by prussic acid. ‖ Dr A. T. Thomson is inclined to believe that, as the general sensibility is morbidly increased in phrenitis, the hydrocyanic acid may be useful as an adjuvant to other remedies. ¶ Dr Guerin of Mamers obtained beneficial results in two cases of brain fever. ** Caspari and his colleagues have treated gastritis and enteritis

* Magendie's Formulary, translated by Gregory.
† Granville, Treatise, &c. p. 59. ‡ Prospetti Clinici, p. 29.
§ Rust, Magazin, xxii 2e Cah. or Journ. des Progres des Scien. Med. ii. 63.
‖ Granville, Treatise, &c. p. 264, &c.
¶ Cyclop. of Pract. Med. Art. *Sedative.* ** Magendie's Formulary, p. 92.



with doses of hydrocyanic acid, and, as they say, successfully. As acute gastritis under an idiopathic form is exceedingly rare, it seems more probable that the medicine has been found useful in those chronic inflammatory conditions of the mucous membrane of the stomach;—cases which are not unfrequent in the higher classes of society.

A host of instances are brought forward by Granville to show the great utility of the acid in bronchitis, pneumonia and pleurisy. But since in all these cases we find the lancet to have been used, it is impossible to say how far the hydrocyanic acid assisted, if it assisted at all, in effecting a cure. There are cases of acute inflammation of the chest occurring, in which, after profuse bleedings and evacuants have not succeeded in arresting the disease, when the patient has become excessively weak and restless from want of sleep, and where depletion cannot be carried further with safety, that something of a soothing nature is required. Under those circumstances, the exhibition of the prussic acid may be attended with considerable advantages, and probably possesses a superiority over the strictly narcotic medicines.

Cases of rheumatism have been frequently treated by prussic acid. Mr Taylor ranks it as a specific. *

3. In hemorrhagies this medicine has been much lauded by Granville. "In *passive* hemorrhagies, no advantage,—in *active*, much confidence can be placed in the internal use of the hydrocyanic acid." † Dr Elliotson does not speak so favourably of its employment. ‡

4. *Stomach and Bowel Complaint.*—Under this head will be noticed the several forms of dyspepsia, and likewise dysentery, in which the hydrocyanic acid has been found useful. Dr A. T. Thomson was the first in this country to administer this medicine in cardialgia. He ascribed its good effects to its "reducing the morbid irritability of the secreting surface of the stomach, thereby enabling the juices of the organ to be more slowly secreted, and of a more healthy character." § Dr Granville has found it successful both in public and private practice. In 1820, Dr Elliotson published a pamphlet on the Efficacy of the Hydrocyanic Acid in Stomach Complaints; arranging these into classes. He relates seventeen cases where the chief symptom was "pain about the pit of the stomach." Many had tried the usual remedies with no relief. The acid effected a cure. This medicine relieved a variety of symptoms connected with the pain of the stomach, such as flatulency, loss of appetite, and depression of spirits, &c. Several cases of pain at stomach, attended with pyrosis, were treated with

* Edin. Med. and Surg. Journ. xix. p. 399.
† Cyclop. Pract. Med. loc. cit.
‡ Cases by Elliotson, p. 49. § Granville's Treatise, p. 366.

equal success. From the reports of many of the above cases, it does not appear necessary that the bowels be lax or in a particular good state before the medicine can display its good effects. In four cases defined by Dr Elliotson, "in disorders of the stomach occasionally resembling some of the heart in the occurrence of sudden pain especially on motion, about the præcordia, and in the circumstance of the left shoulder and arm being affected," the alleviating power of the hydrocyanic acid was strikingly shown. The symptoms exhibited by those patients appear to me to differ little from those of *angina pectoris*; and if the pathological seat of this disease be proved to depend sometimes on affections of the stomach, as supposed by Drs Brera and John, * we might then hope to relieve those who unhappily suffer from this complaint. Dr Prout informed Dr Elliotson that the prussic acid failed only in one case out of several in which he tried it. † Dr Macleod recommends it strongly where there is much pain in the stomach, or anomalous feelings about the chest and heart. ‡ Many authorities and isolated cases might be quoted from the different periodicals of the day in proof of the efficacy of the acid in dyspepsia. My friend, Mr Hodgson of Carlisle, who has tried it in more than a hundred cases, remarks in a note to me, "This medicine seems to have a peculiar sedative action on the mucous membrane of the stomach, particularly when affected with that very common disorder, morbid irritability." As an apprentice, I have had frequent opportunities of witnessing the effects of the hydrocyanic acid in his hands; and although I omitted to take notes, I have a distinct recollection of one case in which the acid was eminently useful. It was that of a female relative who laboured for several weeks under pain of epigastrium, anorexia and vomiting, which were not at all relieved by the remedies usually prescribed. The hydrocyanic acid given in two drop doses two or three times a-day, soon enabled her to take a hearty meal without the least inclination to vomit. One of the best proofs of the acid being the remedial agent, is drawn from the circumstance of her having a relapse, which readily yielded to a few doses of the mixture previously employed.

Vomiting, a symptom arising from many morbid conditions, appears to be much relieved by the prussic acid. Excepting the strictly inflammatory states which give rise to this symptom, I am inclined to think, from numerous observations, that this medicine will be found highly useful in chronic vomiting, and may be ranked next to creosote in value. Several practitioners in London and elsewhere found it useful in arresting the vomiting which so invariably attended cholera.

* Elliotson's paper, p. 33. † Ibid. p. 43.
‡ Lond. Med. and Phys. Journal, Vol. lix.



There can be no doubt but that pyrosis, and the other unpleasant symptoms associated with the different forms of dyspepsia, owe their origin to some particular state of irritability, over which the prussic acid exerts a speedy and remarkably beneficial influence.

The hydrocyanic acid has been recommended in dysentery by Dr A. T. Thomson, who attributes its good effects to the allaying of irritation. During the last summer I tried the acid in two or three cases with marked benefit. In one case, that of a female aged thirty, in her seventh month of pregnancy, affected with the ordinary symptoms of slight dysentery, I prescribed leeches, calomel, and opium, &c. with fomentations to the belly, for three days, with so little success, that the friends of the patient lost confidence in my recommendations. The prussic acid was now ordered, more with the view of changing the treatment than any great prospect of success, but in this I was agreeably disappointed, for on calling the next day I found the patient sitting up comparatively free from pain. When the uneasy griping sensations threatened her, she had recourse to two table spoonfuls of a mixture, which contained a scruple of Scheele's acid to eight ounces of distilled water.

As hypochondriasis depends on so many different causes, few practitioners will be found to support the statements of those who boast of the efficacy of the hydrocyanic acid in every form of the disease. Cases originating in derangement of the stomach, or kept up by morbid state of the chylopoietic viscera, may be advantageously treated by this medicine.

5. The violence of the paroxysms in tetanus has been allayed, and, according to Elliotson, a perfect cure of chorea established by the employment of the hydrocyanic acid. This medicine, like many other remedies prescribed in epilepsy, has now fallen into disuse, —partly from its inutility in the hands of numerous practitioners, and partly also from the recollection of the dreadful affair at Saltpetriere in Paris. Since epilepsy depends so frequently on organic affections of the brain, it is obvious that, in these cases at least, the prussic acid cannot be of the slightest advantage in arresting the disease.

Having pursued so far pretty closely the arrangement of Cullen, we may here, perhaps, advantageously deviate from this, and classify those diseases of the chest which cannot be so conveniently arranged under former heads.

6. ***Some Catarrhal and Spasmodic Affections of the Respiratory Organs.***—With the exception of the purely inflammatory affections of the lungs, there are no diseases to which so much attention has been paid by the several writers on the prussic acid as catarrhal and spasmodic affections of the respiratory organs. The highly eulogistic strain of language in which many authors have

recommended its employment in those diseases can hardly find a parallel in the history of medicine. Brugnatelli recommended the acid so early as the year 1807, in angina, tubercular cough, catarrh, &c.* and Borda, Brera, and Heineken† have used it very generally in pectoral complaints. Magendie, who has perhaps investigated the therapeutical action of the prussic acid more than any physician in France, states it to be useful in the great number of cases of the nervous and chronic cough affecting females. In some cases where opium seriously incommoded the patient, and where no rest had been obtained for several days, the prussic acid calmed the cough in a few hours. Encouraged by this success, Magendie made repeated trials of the medicine in phthisis, and he states, that he found it "diminish the intensity and frequency of the cough, moderate and facilitate the expectoration, and in fine procure sleep without exciting the colliquative sweats." M. Lerminier, at the suggestion of Magendie, administered the acid in one-twentieth of the cases of phthisis admitted into the Hospital La Charité with great relief to the cough expectoration and watchfulness. Magendie seems fully confident of the curative effects of the medicine in the first degree of phthisis pulmonalis.‡ The Italian professors, according to Manzoni's thesis, have lauded the acid in every disease of the respiratory organs. Dr A. T. Thomson thinks the prussic acid valuable as a palliative in the early stages of phthisis, by "diminishing the hardness and frequency of the cough, and lessening the general hectic tendency."§ Dr Nancrede of Philadelphia,‖ Dr Kergaradec of Paris,¶ and Dr Frisch of Nyborg,** confirm Magendie's statements. Dr Granville has devoted no less than a hundred pages of his treatise to cases of phthisis treated by himself and others, and seems to think that recovery may be expected even at an advanced period of the disease, if the acid be employed. It is well to remember, that at the time these reports of "incipient" and "confirmed" consumptive cases were drawn up, the stethoscope was almost unknown in this country, and must have been entirely so to Dr Granville, as may be seen by referring to the 206th page of his work It need hardly be remarked, that severe catarrhal affections of long standing induce very unfavourable symptoms, which might easily be confounded with phthisis.

Some authors are less sanguine of the utility of the prussic acid in phthisis, amongst whom is Dr Elliotson, who has frequently

* Granville's Treatise, &c. p. 123.
† Nouveau, Journ. de Med. Aout 1821.
‡ Magendie's Memoire, passim. § Cyclop. Pract. Med. *loc. cit.*
‖ Philadelphia Journal, May 1821, or Lond. Med. and Phys. Journ. Vol. xlvi.
¶ Magendie's Memoire, p. 59. ** Ibid. p. 92.



tried it even at the commencement of the disease, but with no success.

From the conversation I have had with a number of medical practitioners, I am inclined to suppose, that few physicians place much, if any, confidence on the acid in the treatment of catarrh and phthisis.

As medicinal agents may retard in some degree the first breaking up of the tubercular deposits in the pulmonary tissue, it is possible that the prussic acid may effect this purpose by allaying the irritability of constitution, cough, &c. which are usually present, at the same time attention is paid to the restoration of the healthy functions of the body by exercise and regimen. Should the tubercular ulceration be no longer a matter of doubt, we can only look for palliative remedies, and watch for any inordinate action of the circulation, which, if unsubdued, frequently leads to the fresh deposition and ulceration of tubercles. As opium and the strictly narcotic medicines frequently disagree with the patient, by affecting the head, exciting night-sweats, and disturbing the natural action of the alimentary canal, they are objectionable. On the other hand, the hydrocyanic acid, by subduing morbid sensibility, allaying cough, and promoting expectoration, without exciting the nocturnal sweats, becomes a useful palliative; but, as Dr Elliotson has remarked, "to extol it as a remedy is only doing an injustice to a most useful medicine."

The laurel water and free hydrocyanic acid are considered by Dr A. T. Thomson as almost specific in *phthisis trachealis*.

Opium often fails to relieve the paroxysms of asthma, and hence the numerous other narcotics recommended by practical writers on this disease. We have a mass of evidence in favour of the employment of the hydrocyanic acid in at least the spasmodic form of asthma. Granville recommends it in what he calls the "catarrhus suffocativus," and, according to Thomson, the acid acts almost spontaneously in the spasmodic asthma by relieving the oppressed state of the pulmonary circulation.* This it can only do by allaying the spasm upon which many of these alarming symptoms depend, and not from any peculiar action on the respiratory organs themselves. Magendie, Elliotson, and others speak highly of this medicine in the spasmodic form, where it certainly appears to be of great advantage. As asthma is frequently connected with, and aggravated by, organic diseases of the heart and lungs, we cannot expect any permanent relief from the acid in such cases.

*Pertussis.*—Dr Fontanelle, who saw much of this disease, and was amongst the first to try the prussic acid, states that

* Cyclop. Pract. Med. loc. cit.

he obtained wonderful results from the prussic acid.* He had tried the antiphlogistic treatment along with various narcotics, but without success. The disease was viewed by him as having its particular seat in the nerves of the mucous membrane of the lungs. Dr Kergaradec relates three cases.† In a review of Dr Macleod's cases in which the acid was employed, it is stated that, of upwards of one hundred cases of hooping-cough, only three proved fatal, the remainder having recovered under the use of the prussic acid, with the exception of twelve cases. ‡ Granville, Thomson, and Caspari § deem the acid to possess great advantages when early resorted to. As pathology has not as yet thrown much light on the proximate cause of hooping-cough, we can only trust to observation and experience in the recommendation of any medicine as a cure. In Fontanelle's cases there was no inflammation, and in twenty-three cases examined at Trevisa in 1816, the trachea was constantly found healthy, although lined with a frothy, blackish and adhesive mucus.

The hydrocyanic acid has been tried in colic, hysteria, and hydrophobia, but without much success, and although much lauded by Caspari, Taylor, and others, in neuralgia, it appears to be useful only where the deranged state of the stomach is the primary cause.

7. *Skin Diseases.*—Caspari recommends the acid in erysipelas. According to Dr A. T. Thomson, it may be used as a lotion in three species of lichen,—in prurigo to allay the vexatious itching, and in lepra, where the skin is very irritable. In impetigo, where there is much vesication, and ointments are too irritating, the hydrocyanic acid properly diluted with the addition of the acetate of lead, was found highly serviceable. Ecthyma, eczema, and acne seemed also much benefited.‖ Dr Schneider diluted the acid with alcohol, and used it as a lotion in prurigo and herpes. ¶ Dr Baganini employed it with great success in painful affections of the skin.** The experience of Dr Elliotson on the external application of the acid does not afford such beneficial results.

To give a summary of what has been written on the therapeutical properties of the hydrocyanic acid, it may be stated that this medicine is proved to be of some importance in certain forms of dyspepsia, in spasmodic affections of the respiratory organs, and in those cutaneous diseases attended with itching and irritability. That it may form a useful adjuvant to other remedies in allaying

* Description de la Varicelle qui a régné épidémiquement et conjointment avec la Variole dans la ville de Millau (Aveyron) en 1817. Montpellier, p. 21.
† Magendie's Memoire, p. 63. ‡ Lond. Med. and Phys. Journ. Vol. xlvi. p. 361.
§ Journ. des Progres, loc. cit.
‖ Atlas of Delineations of Cutaneous Eruptions.
¶ Rust's Magazin, quoted in Journal des Progres, Tome iii. p. 228.
** Bulletin General de Therapeut. Fevrier 1834.



those of the troublesome symptoms of phthisis, in mild dysentery, where irritability is the principal cause, and in some neuralgic affections.

The observations of numerous authors, combined with what I have myself frequently observed in the administration of the acid in dyspepsia, &c. lead me to believe that it is not necessary that the physiological action of the medicine should be induced before its therapeutic effects are manifested.

VI. *In what manner does Hydrocyanic Acid act as a Poison?*—This question, although of minor importance in practical medicine, is exceedingly interesting in a toxicological point of view. As it is only through vascular or nervous connection that a poison applied to one part of the body can produce its effects on the body generally, I may set out by stating that the hydrocyanic acid acts either by being taken into the circulation, and carried by that medium over the whole system; or by its direct impression on the nerves of the part to which it is applied, and so affecting sympathetically the other organs of the body.

However plausible the opinion may be, that the hydrocyanic acid acts on the system in the latter mode, or by *sympathy*, it must be admitted that not a few writers, even of authority on this subject, have adopted the former, or that of *absorption*. Many of the conflicting opinions on this subject are to be traced to the physiological doctrines in vogue at the time; others to preconceived notions of the authors; and not a few are derived from experiment. These latter alone deserve attention; but the limits of this essay allow only an epitome of the results of the experiments.

The experiment of Coullon, with which those of Emmert coincide, induced these observers to believe that the prussic acid does not act by means of the nervous system. The principal experiments were made on the brain, spinal marrow and nerves. Those on the brain are certainly objectionable, as part of the acid came in contact with the cut edges of the integuments. The second and third series of experiments proved nothing more than that a local action was exerted by the acid on the respective parts of the spinal cord and nerves, by which they were disabled from propagating (to the muscles they supplied) the impressions made on their poisoned surface.

These physiologists found that a tight ligature applied between the wounded part and the centre of the circulation, prevented the poisonous influence of the prussic acid. This is easily accounted for on the fact, that the limb was not in its natural state;—the circulation being obstructed, the nerves, even if not compressed, would have their functions annihilated for the want of due nutrition. Emmert's experiment of tying the aorta, and applying prussic acid to the posterior extremities without injury to the animal, is quite

inconclusive. Coullon placed the cut ends of three branches of the brachial plexus in prussic acid without the animal experiencing any symptom of poisoning, which experiment certainly proves that the divided nervous trunks do not transmit the influence of the acid to the system.

The experiments of Krimer are the most extensive in support of the doctrine of absorption. From six experiments, he concludes that the acid does not act as a poison, neither when applied to the neurilema, nor to the nervous pulp itself; and that it exerts no greater influence on the brain and spinal cord than an equal quantity of alcohol. He cut the nerves going to the tongue of a dog, and applied the acid next day to this organ, and death soon followed. Apparently suspecting the fallacy of this experiment, he went still further, and not only divided the nerves of the tongue, but also the *par vagum* and sympathetic nerves in the neck of a dog, and then applied the acid as in the former experiment, and with an analogous result.

If Krimer had confined the acid to the tongue by proper apparatus, his experiment would have been conclusive, that absorption was necessary; but no mention is made of his having done so, therefore there is an evident source of fallacy. For allowing that all the nerves of the tongue were cut, have we not branches of the sensitive portion of the fifth pair distributed on the lining membrane of the mouth, and the inferior palatine coming from Meckel's ganglion, supplying the arch of the palate upon which nervous extremities the acid, from its great volatility, would soon come in contact, and induce its usual effects on the system?

The decapitation of an animal, or removing the brain from its cavity, to try the effects of a poison when given by the mouth, as has been practised by Emmert, requires no comment.

Ligatures placed on the arteries of an extremity, whilst the nerves remain entire, preventing the poison applied to the limb from acting on the system, was to be expected from the imperfect vitality of the isolated limb. The reverse of this experiment, viz. the dividing of the nerves, and keeping the vessels entire, proves that the acid is carried by these vessels into the general circulation, but not that the poison acts in this way.

If the above experiments can be relied on, they show that the acid has no influence on the system, when applied to the trunks of nerves,—the spinal cord or brain. But do these facts militate against the opinion, now very general, that the prussic acid acts by nervous transmission?

In reference to the nerves, it may be briefly remarked, that, from the mechanical arrangement of the filaments of the nervous trunks and expanded extremities, impressions made on the latter act more energetically than when applied to the former,—a fact which leads us to believe (what the above experiments go to prove) that



the operation of poisonous agents is upon the sentient extremities, not the trunks of the nerves. The experiments made on the brain, instead of supporting the doctrine of absorption, are actually more in favour of sympathetic action? Granting even that the blood was carefully wiped from the parts of the brain to which Emmert applied the acid, how is it possible that the acid could escape the mouths of the divided vessels, and be prevented from reaching the general circulation. Or if there were no open mouths, we should certainly expect it to permeate the coats of the blood-vessels themselves.

Having shown that there is a source of fallacy in the experiments which Coullon, Emmert, and Krimer instituted to prove the action of the prussic acid by *absorption*, it is necessary to state the facts which may be adduced in support of an opposite doctrine, or that of action by *sympathy*.

I shall commence by noticing those local effects of the poison, where no alteration of structure takes place in the part to which it is applied, and which are sufficiently well expressed by the term "nervous impressions." Robiquet observed, that when the finger was applied to the open end of a glass tube containing the vapour of the acid, it became benumbed, and remained so longer than a day. I have experienced a similar sensation, though in a slighter degree, from keeping my finger over the opening of a flask which contained the pure hydrocyanic acid. My friend Dr Howe, who kindly assisted me in many of my experiments, kept his thumb for some minutes upon the aperture of a flask containing three drachms of the strong acid. In a short time the sensation of numbness was perceptible, and continued for some hours. Professor Traill informs me that he has tried the same experiment several times, and with analogous result. Coullon's experiments on the hearts of frogs satisfactorily show the local action of the acid. The heart of one frog immersed in prussic acid lost its contractility entirely at the end of eighteen minutes, whilst another, left exposed to the air, continued contractile for several hours. He plunged one of the hind legs of a frog into the acid, and left the other free. The first became palsied in thirty-five minutes, whilst the other retained its contractility perfectly.*

Numerous are the instances recorded in works on toxicology, of persons who have been knocked down, or otherwise speedily influenced by a single inspiration of the vapour of the acid. The astonishing rapidity of the action of the acid in the experiments of Robert,† Macaulay,‡ Christison, and some of my own, appears incompatible with the opinion, that it must be absorbed before it

* Coullon, Recherches, &c. p. 179.

† Annales de Chim et Phys. xcii. p. 96. The experiments were made with the vapour of the acid. Robert states that a bird had its beak applied to the opening of the matrass in which the acid was forming, and became instantly ("à l'instant") motionless. A rabbit and cat died almost as suddenly.

‡ London Med. Gazette, viii. 797.

can produce its effects, even supposing the investigations of Hering, which seem to show that substances are transported with great rapidity along the vascular system, to be correct. The single experiment made on the jugular vein, which I have detailed at page 47th, did not imply a more speedy action of the acid introduced into the system in this way, than by the trachea, which we should have expected according to the doctrine of absorption.

The experimental investigations of Morgan and Addison have elicited important facts in support of the sympathetic doctrine of poisons generally. At the same time I doubt much if these physiologists are correct in stating it to be *their own* theory,* if by this it is to be understood that it is entirely new. Fifty years have elapsed since Fontana was labouring hard to overturn the same theory, or rather, we should say, that view which Morgan and Addison are apparently inclined to adopt; for they have not explicitly stated whether it be the sentient extremities of the nerves found in the blood-vessels, or other parts of the body, that serve as the medium of communication between the poisonous agent and the brain. Fontana informs his readers, † that he found in some authors a great difficulty in favour of the influence of the nerves in opposition to the transmissile power of the blood-vessels, in the case of opium injected into the latter,—in the circumstance, that the action of the substance is conveyed suddenly in opposition to the nervous extremities of the red vessels even, and hence the whole of the nervous system.

Having stated both sides of this intricate question, and as far as my limits afford to an equal extent, I am willing to believe that, although the hydrocyanic acid is absorbed and carried into the circulation, its *modus operandi* upon the sentient extremities of nerves seems most probable.

* Essay on the Operation of Poisonous Agents, p. 60. Lond. 1829.
† Traité sur le Venin de la Vipere, Tom. ii. p. 367. Florence, 1781.

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Dr Monro's
With the author's best wishes

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# HISTORY OF A MONSTROSITY

## PRESENTING REMARKABLE PECULIARITIES IN THE ARRANGEMENT OF THE NERVOUS SYSTEM;

WITH A

## BRIEF INQUIRY INTO ITS TERATOLOGICAL AND MEDICO-LEGAL RELATIONS.

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(*From the Edin. Med. and Surg. Journal, No.* 157.)

The circumstances connected with the birth, and the peculiar malformations and deficiencies in the nervous centres of the fœtus forming the subject of the following remarks, will, I am led to think, be found deserving the attention of the practical physician, equally with him who is more interested in physiological and teratological inquiries.*

A female belonging to the labouring class residing in the north of England, who, if I remember rightly, had borne several children, and all well-formed and healthy, was delivered, eighteen months ago, of a female child, at the full term of utero-gestation, exhibiting some peculiarities about the head, which immediately attracted the notice of those in attendance. The child was reported by the surgeon-accoucheur to have breathed. This statement, coupled with some remarks which fell from the same gentleman immediately after the delivery, and more especially, perhaps, the natural curiosity excited in the minds of the female attendants

* The case was introduced to the notice of the Royal College of Physicians at one of their evening meetings in June.

by the unusual appearances which the child presented, led the more gossiping portion of the community to whisper that the surgeon, knowing the child to be a monster, had destroyed it in the birth. These rumours had been afloat for several days, until at length the registrar of the parish conceived it necessary to acquaint the coroner with the circumstance, and on the ninth day after delivery, the body of the infant, by his direction, was disinterred,* and a jury was summoned to inquire into the cause of its death. The *post mortem* examination was intrusted to my much esteemed friend Dr Oliver of Carlisle, in conjunction with Mr Rome of Longtown.

I shall here allude only to the more important circumstances of the *post mortem* inspection,—those which sufficed the medical witnesses to form their opinion as to the important question of the child's viability; reserving the minuter anatomical details to be discussed under the head "*anatomical characters.*"

The body and limbs of the fœtus were well formed. A large tumour was found to occupy the occipital region, and the posterior part of the neck: this tumour was distended with bloody-coloured serum. The anterior and middle lobes of the brain appeared to be properly developed, and occupied their usual positions in the cranial cavity, whilst the posterior lobes were much smaller, and were partially squeezed through a large abnormal opening or deficiency in the occipital bone. The cerebellum and that part of the occipital bone in which it is normally lodged were wanting. There was not the slightest vestige of *medulla oblongata* or spinal chord, and the posterior arches of the vertebræ did not exist. The lungs sank in water, as well separately and in cut portions, as with the heart attached to them. The medical gentlemen reported as the result of their examination of the body, that as certain portions of the nervous system, which in their belief were essentially requisite for the performance of the respiratory functions, were totally wanting, they had no hesitation in concluding, that the child could not have breathed; and that they were confirmed in this conclusion, by finding no evidence whatever of the lungs having been inflated. The medico-legal investigation ended here; the jury returning a verdict of "Natural Death."

The facts of the foregoing narrative were mentioned to me personally by Dr Oliver two days after their occurrence. I cannot here overlook the kindness which prompted him to place the fœtus in my hands for a more minute dissection † than was possibly consistent with the time and opportunities afforded those who are called upon to conduct a *post mortem* examination, whilst

* These circumstances occurred during the severest cold of winter, (January 1842), and when the snow covering the public roads was several feet in depth. The tissues of the body had, therefore, not suffered from decomposition.

† In speaking of more minute dissection, I refer especially to the anatomy of the nerves.



a coroner and jury are waiting the results of the investigation in an adjoining room. The reader must not suppose from the above remarks, that the examination was hurried in the slightest degree. The thoracic and abdominal viscera had been carefully examined by my friend and his coadjutor, after they had notified the malformations in the nervous centres, and the inadequacy of these to maintain the springs of life in action, in a being no longer dependent on its maternal sources for nourishment.

To adopt a methodical arrangement of the historical details of the present case, and to render the remarks which naturally suggest themselves in connection with it, as practically useful as their character will admit of, I shall describe, *first*, the configuration and minute anatomy of the fœtus; and *secondly*, endeavour to point out the position which it ought to occupy in the classification of monstrosities adopted by modern authors; and *finally*, allude to its medico-legal relations.

*Anatomical Characters.—Externally.*—The fœtus, as already stated, was of the female sex,* fat and plump. Its limbs were well-developed, and when placed on its back, nothing irregular could be perceived about the head, face, or trunk. Whilst the anterior, superior and lateral regions of the cranium presented the normal characters of a child at the full period, the integuments were more or less covered with hair; the occipital region, considerably elevated, was occupied by a soft and elastic tumour, whose size was little short of the fœtal head, and which extended laterally and posteriorly so as to conceal part of the neck and likewise a small portion of the back. The common integument formed the external wall of the tumour,—that part which looked towards the vertex being covered with hair. Below the tumour, the dorsal region appeared at first sight normal; a closer examination, however, detected the absence of the spinous processes, and an unusually flattened appearance at the lowest part of the vertebral column.

*Internal Appearances.—Encephalon.*—An incision was made through the frontal bone at a point immediately above the nose, and continued directly backwards along the sagittal suture to the occipital bone; the flaps were thrown outwards, and in this way the anterior and upper surfaces of the brain were exposed. At this stage of the dissection, it was noted that the vessels of the *pia mater* were much distended, and that the cerebral structure

* It would appear that the majority of human monsters, at least, where the nervous system is at fault, belong to the female sex. Morgagni advocates this opinion, which has since received the sanction of Sandifort, Sœmmering, Meckel, Tiedemann, and others. The reports of cases being found in isolated journals, it is difficult to ascertain the exact proportion, but Meckel (Descriptio Monst. Neonullor, p. 51,) who collected ninety-one cases, found that fifty-three were of the female and thirty-eight of the male sex.

presented the usual healthy characters. The division (along the centre) of the small part of the occipital bone that had been developed, and the integuments forming the wall of the large sac, as also the integument along the mesial line of the dorsal aspect of the body, were next accomplished. This dissection exposed the contents of the tumour, which consisted of bloody-coloured serum. The same kind of fluid occupied the ventricles of the brain and the sub-arachnoid cellular tissue of the base. On the escape of the fluid from the tumour a marked deficiency in the occipital bone (afterwards discovered to be that part which extends from the *foramen magnum* to the occipital protuberance) was detected, and a portion of the cerebral substance about the size of a large walnut protruded through it into the tumour or sac. This portion of nervous substance evidently belonged to the posterior lobes, and was connected at the base of the brain with the *Pons Varolii*, or rather an irregular nodulated looking mass found in the position of the *Pons*. On lifting up the anterior lobes for the purpose of examining, in the usual way, the base of the brain, the presence of a quantity of dirty-coloured serum, similar to that met with in the occipital tumour, rendered the dissection less clear than in other parts. There seemed little doubt, however, of the normal characters of the structures until approaching the position of the *Pons Varolii*, where the nervous substance terminated abruptly. It was found difficult to specify the exact characters beyond what have just been stated of the posterior terminating portion of the base of the brain. The absence of the *cerebellum*, and of that portion of the wall of the cranium which encloses this part of the encephalon, renders it extremely probable that this abrupt termination or nodulated portion of cerebral substance did not constitute a true *Pons Varolii*. There was not, as has before been stated, the slightest vestige of *medulla oblongata* or *medulla spinalis*.

*Dura Mater and Spinal Column.*—The *dura mater* was observed to line the walls of the cranium, and to be continued to the inner surface of the tumour, where it became closely connected with the integument. Tracing it from the tumour towards the neck, some shreds* only could be met with in the spinal canal, and these in pretty close contact with the posterior part of the bodies of the vertebræ. The extreme tenuity of the integuments covering the spinal canal prohibited the supposition of the *dura mater* lining their inner surface in the manner observed to exist in the interior of the sac. The circumstances above narrated evi-

* This appearance in a case that presented some characters analogous to the fœtus whose history I am recording, may have led Professor Duges to say that the spinal canal was filled by a filamentous stratum, ("une couche filamenteuse",) apparently the remains of the spinal cord. The microscopical examination inclines me to believe that the shreds noted above were fibrous, and belonged to the *dura mater*.



dently point out that such a membrane was uncalled for in the absence of that important division of the nervous system which it naturally encloses.

The deficiency in the spinous processes and laminæ,—in short, of the posterior arches of the vertebral column, might have been anticipated along with the total absence of the *medulla spinalis*.* In reference to this deficiency it ought to be remarked that the development of the laminæ had proceeded pretty nearly to a completion in some of the cervical vertebræ; this development was gradually less marked towards the lower part of the column where the bodies alone existed.

*Vascular System.*—The heart was normal, as were all the viscera of the trunk. I need only allude to the vessels distributed upon the nervous centres, and their surrounding walls. The carotid arteries of each side, and their divisions into external and internal, were in just proportion. The complete development of the anterior and middle lobes of the brain led me to anticipate the regular size of the internal carotids, whilst the absence of cerebellum and *medulla oblongata* did not prepare me for the size of the vertebrals, which deviated very slightly from the natural standard. The occipitals were extremely large, and evidently related to the growth of the tumour; perhaps the vertebrals had been mainly distributed to the same morbid growth, which will account for their larger size.

With the exception of a partially cleft palate, the remaining parts of the face and organs of sense were perfectly developed. The thoracic, abdominal, and pelvic viscera were normal.

*Nerves.*—The *Sympathetic* or *ganglionic* system of nerves presented their normal characters. I carefully examined the *Cerebral* and *Spinal* nerves at their exit from the different foramina in the base of the cranium and intervertebral foramina, and on tracing them to the periphery of the body, could detect nothing irregular, either in the formation of the different plexuses, or in the anastomoses and ultimate distribution of the nerves to the muscular and other organs of the body. My attention was now directed to the central extremities of the nerves, or the positions of the nerves seen within the cranium and spinal canal. This part of the inquiry has afforded interesting results.

The *Olfactory* nerves could not be satisfactorily examined. The *Optic* nerves were flattened in form, and imperfectly developed. The central extremity of the nerve, or that which had been connected to the cerebral substance, had been removed along with the brain, but the microscopical examination of the nerve, two or three lines from the point where it penetrates the sclerotic, displayed

* This opinion is sanctioned by the labours of Geoffroy Saint Hilaire, Philosophie Anatomique, Paris, 1822; and Serres, Recherches d'Anatomie Transcendante et Pathologique. Paris, 1832.

only isolated portions of the tubulous structure of the nerve, imbedded in a quantity of fibrous tissue, the appearance of an extremely atrophied condition of the nerve. On dissecting the parts within the orbit, each of the nerves was found distributed in the usual manner upon the muscles, &c. contained in this cavity. The third, (*motor. ocul.*); fourth, (*trochleator*); and sixth, (*abducens*) pairs of nerves could be traced backwards from the orbit through the *foramen lacerum orbitale*, along the cavernous sinus to its posterior part, where they became so extremely delicate, as to render it difficult to say that they had ever shown themselves beyond the sinus. The three divisions, and Casserian ganglion of the fifth pair were normal; the portion of the nerve on the cerebral side of the ganglion presented a short truncated appearance. The seventh, (*portio dura* and *portio mollis*); the eighth, (*glosso-pharyngeal, pneumo-gastric*, and *spinal accessory*); and the ninth pairs of Willis, and also the first, second, and third cervical nerves were hanging as loose threads in the cranial cavity, or at the junction of this cavity with that of the most superior portion of the spinal canal. * The length of these nerves, measured from their free extremities to their entrance of the foramina, through which they make their exit from the cranium and spinal canal, varied slightly from one and three-fourth inches to two and one-fourth inches; the first cervical nerve being the longest. The remainder of the spinal nerves, though visible without dissection, (the cervical being most distinct) did not hang loose in the cavity in which they were lodged. This anomalous, if not unprecedented condition† of the nerves, made me anxious to ascertain in what way the

* The free extremities looked upwards and towards the basilar process of the occipital bone. The uniformity of this direction makes it probable that this was their arrangement in the fœtus in utero.

† In conversing with my friend, Professor J. Y. Simpson, whose intimate acquaintance with the history of monstrosities is well known, regarding the unusual appearance of the nerves in this case, he kindly informed me that a somewhat similar arrangement of the nerves had been described by Lallemand some years ago. In the course of my reading, I have more than once met with references to Lallemand's case, but have not been able to lay my hands upon the original work, entitled "Observ. Pathol. propres à éclairer quelques points de Physiologie, Paris, 1825; or his Thesis, published in 1818." M. Ollivier's reference (Traité de Maladies de la Moelle Epinière, Paris, 1837, p. 166,) to the case observed by M. Lallemand, distinctly indicates that it was not an anencephalous simply, but along with this malformation the spinal cord was absent. The following quotation from M. Ollivier's analysis of Lallemand's case is justifiable, since a different interpretation has been offered on the mode in which the nerves terminated by those who have had access to Lallemand's work. "A la surface de cette membrane" (M. Ollivier is speaking of the *dura mater*) "on voyait deux rangées de tubercules blanchâtres, de la grosseur d'une tête d'épingle, répondant à chaque espace intervertebral. A ces tubercules aboutissaient les nerfs du cou, du dos et des lombes. Les racines d'origine de ces nerfs avaient été detruites avec la moelle. En soulevant de chaque coté la dure-mère apres l'avoir fendue, on voyait ces nerfs partir de cette membrane pour de rendre aux différens trous de conjugaison. Ceux du cou, excessivement grêles, montaient presque perpendiculairement pour passer entre les vertèbres cervicales; ils ne contenaient pas de substance nerveuse, et cependant, apres avoir traversé les trous de conjugaison, ils avaient le volume ordinaire; ceux du dos étaient plus gros, surtout les inferieurs; ils renfermaient de la substance blanche."

Geoffroy St Hilaire (Philosophie Anatomique, Paris, 1822.) evidently alludes to the same case, which he calls "L'Anencephale de l'Hotel-Dieu," from its being born in that hospital, (Hotel-Dieu); and in reference to the nerves, he quotes (p. 130.) Lallemand's own words, "tous les nerfs qui naissent du cerveau sont libres et flottans à la base du crâne." This quotation from Lallemand's Thesis expresses the same condition as that described in the text.

Geoffroy St Hilaire describes a nearly similar case to that above, under the term "Anencephale de la Seine." The circumstances which led to this nomenclature are best known to himself and Madame Riguet, who had acted in the capacity of *sage femme* on the occasion. However, the case was not simply an anencephalous, but like that of Lallemand's, was deprived either in part or wholly of spinal cord. In describing the dissection and display of each of the cerebral and spinal nerves, he concludes the sentence thus; "Mais, ce qui forme le haut intérêt de l'observation, nous apercûmes ces nerfs écartés, isolés, entièrement libres, les uns à l'egard des autres." The reader cannot fail to observe a great resemblance between the *anencephales de l'Hotel Dieu* and *de la Seine*. And whilst G. St Hilaire describes the nerves of the latter (de la Seine) as having "ni franges, ni extrémités flottantes," but as being lost in the tegumentary membrane, he at the same time admits the analogy of the two cases, only, however, on the supposition that Lallemand's description of the floating nerves resulted either from preconceived notions, or an imperfect state of the preparation upon which the observations were made.



delicate bundles, of which each nerve is composed, terminated; whether the free extremities simply marked out the separation, or breaking across of the nerves from the parts to which they had been attached, (that attachment being nervous or otherwise,) or if they were the true central terminations in the brain or spinal cord of the nerves themselves. Viewing this question as one of considerable interest, every endeavour was made to secure accurate observations. In these inquiries I had the valuable aid of my talented friend Mr Goodsir, whose microscopical investigations are too well known to require any comment here.

The whole of the nerves (hanging loose) of one side were cut across pretty close to their exit from the cranium and spinal canal, so as to obtain at least an inch of their unattached extremities. These were floated in water, and after a little adjustment, the naked eye could detect the existence of a delicate membrane or filamentous-looking tissue, which enveloped the extreme points of the nerves, and appeared to form a kind of connecting medium to these. Small portions of the nerves at the point where these entered the membrane, were placed between two pieces of glass, and on being subjected to a magnifying power of more than 300 diameters, the following facts were observed. In a highly granular-looking membrane, containing nucleated corpuscles of varied size and shape, and here and there presenting a few fibres of filamentous tissue, the bundles of nervous tubes, or the minutest fibrillæ of the nerves, were distinctly seen ramifying. In a few cases, the nervous tubes were in so aggregated a form, or so imbedded in this membrane, that distinct observations could not be made on their ultimate arrangement; at other times in fasciculi so small as to consist only of two,

three, or four tubes; and lastly, and this in the only way in which satisfactory observations could be made, the nervous tubes displayed themselves in an isolated condition or singly. Tracing any one of these tubes from the larger fasciculus of which it formed a component part, onwards to its termination,* it was observed to diverge slightly, this divergence being continued so as to form a greater or less curve, and then to turn back upon itself, gradually approaching the point from where we traced it, and forming in this manner a distinct loop, the convexity of which looked towards the free extremities of the nerve, the concavity towards the fasciculus or stem of the nerve. These loops presented a great variety in shape. At one time the nervous tube took nearly a straight course from the fasciculus, and suddenly becoming inflected, formed a loop which enclosed but a small or narrow elliptical space. At another time the space between the component parts of a loop was of considerable size, either of a horse-shoe shape, or almost circular, and not unfrequently resembling the numeral 8, from the twisting of the nervous tube upon itself.† The difficulty of distinguishing more than a few loops at a time may be easily conceived, when it is borne in mind, that, in addition to the high magnifying power, the varied curves and figures of the loops sometimes formed a kind of net-work,‡ and very frequently one part of a loop passed beneath several others; in other words, occupied a lower plane, and so became lost to view. Moreover, the existence of the granular mass, &c. (the remains probably of imperfectly developed cerebral substance,) surrounding the extremities of the nerves, mingled up with a tissue that may be considered to resemble the *pia mater*, into which the loops seemed to be dipping, rendered the demonstration at times unsatisfactory. In specimens, however, where, by repeated washing in alcohol and water, the granular matter had been in a great measure removed from the sides of the nervous tubes, the loops became very distinct, so that the doubts that had been previously entertained respecting the mode in which the nervous tubes arranged themselves in such specimens, were now dispelled. So clear was the demonstration after the granules had disappeared, that those who were altogether unaccustomed to microscopical inquiries could readily detect the existence and true character of the loops. (See Plate IV. Figures 6, 7, 8.)

Having described thus briefly the anatomical characters, it may be well to inquire how far the peculiar arrangement of the primitive fibres of the nerves in the monstrosity will apply to the elucidation of a question, at the present day more or less canvassed by the investigators of physiological anatomy, viz. the mode in which the nerves terminate. Looking to Germany we observe that nearly the whole of her physiological talent, and this is immense, has been for several years, and still is, devoted to the investigation of the minute organization of the brain and nerves. And whilst we admire the wonderful labours of Malpighi, Leeuwenhoek, Fontana, (whose works have never been sufficiently studied,) and others of past ages, in the field of minute anatomy, it is evident that the German school of the present day is justly entitled to the palm of having discovered all the leading facts in the microscopical anatomy of the nervous system.*

The fact of the nerves consisting of cylindrical tubes, and their running parallel to each other, was pretty well known to Fontana, but not received as orthodox until the extended observations of Professor Müller, corroborated by Kronenberg in 1836, had been published. Müller announced, at the same period, the continuity of the primitive fibres from the centre to the periphery of the body without dividing or inosculating. It then became a question how the nerves terminated. The greater number of observers directed their attention to the periphery of the body, in the hope of elucidating this question more easily than could be done in the nervous centres, and as their investigations are illustrative of some views which my own observations have inclined me to adopt, I may be permitted to glance at the results of their inquiries.

The peripheral expansion or termination of the nerves in the muscles, skin, &c., has been investigated by Rudolphi, (whose observations cannot be safely trusted,) by Prevost and Dumas,† Wagner,‡ Treviranus, Valentin, Emmert, Schwann,§ Burdach,‖ and, more lately, Gerber.¶

Emmert's observations on the muscles of the frog led him to state that the primitive fibres of the nerves "run in a serpentine manner over the muscular fibres, and having described on them a larger, or smaller arch, they return to another nervous cord, or another nervous bundle, or unite with some other single primitive fibre which has just run a similar course, and accompany it to a

* The following pages will show that the terms "termination" and "free extremities," which I have made use of to express the extreme points of the nerves hanging loose in the cranial cavity, are not to be taken in an absolute sense.

† These facts will be better understood by referring to the figures which accompany this paper.

‡ This net-work, as we term the arrangement of the loops, must not be confounded with the terminating plexus of Valentin, or such as Burdach has figured in the skin, to which the reader's attention will presently be directed.



* The reader is referred to a very able article in the British and Foreign Medical Review, October 1838, on the Structure of the Brain and Nerves. This review, and the Encyclopédie Anatomique, at present in the course of publication, contain almost all the facts relative to this interesting subject.

† Magendie's Journal de Physiologie, Tome v. p. 144.

‡ Burdach's Physiology, translated into French by Jourdan. Paris, Tome vii. p. 200.

§ See Encyclopédie Anatomique, Tome vii.; Müller's Physiology, &c., for the views of Valentin, Emmert, Schwann, and Treviranus.

‖ Burdach's Contributions to the Microscopical Anatomy of the Nerves. Quoted by Henle, Traité d'Anatomie Generale. French translation by Jourdan, p. 193.

¶ Gerber's General Anatomy. By George Gulliver, F.R.S.

nervous cord, to which they apply themselves, and in which they then go backwards to the larger nervous stems.* Treviranus and Schwann supposed that the primitive fibres terminated abruptly. It is more than probable, as Müller and Henle have suggested, that the dipping down as it were of the fibrillæ of the nerves between the muscular bundles, led these distinguished observers into error.

The description given by Burdach,† who made use of the *compressorium* in his investigations, differs not from Emmert in regard to the intricate plexus, (terminating plexus of Valentin,) by means of which is produced "a frequent interchange of primitive fibres among the twigs of the same branch or of different branches;" but, he adds, "from this plexus there come forth, lastly, at a point still nearer the end of the muscle, ramuscules, which, being resolved into single primitive fibres or bundles, of very few fibres, form arches or loops, the convexity of which look towards the end of the muscles, the concavity towards the stem of the nerve." These are the "terminating loops" of Valentin.

The terminations of the nerves in the skin have been variously described. Ehrenberg thinks the nerves lose themselves among blood-vessels, whilst Treviranus describes them as terminating in the cutaneous papillæ. The views of Treviranus are opposed by Burdach and Gluge.‡ Valentin describes the terminating loops in the skin similar to those met with in the muscular tissue. Gerber believes each papilla to contain a vascular and nervous loop. Burdach, whose observations seem to have been made with great care, is opposed to the existence of terminating loops, and believes that the primitive fibres of the cutaneous nerves can be traced from their parent stem through the cutaneous net-work,—sooner or later to join themselves to another cutaneous nerve, and, in this way, to return to the central organ.§ Breschet and Roussel de Vauzème‖ at one time admit, at another time deny, the existence of nerves in the papillæ of the skin, and finally conclude that the arrangement of the nerves in the dermoid tissue is unknown.

With respect to the nerves in the other tissues of the body, it would appear from Valentin's researches, "that the nerves have, properly speaking, no peripheral termination, but that in their peripheral organs, the centrifugal part passes without any definite change into the centripetal."

In reference to the central terminations of the nerves in the brain, or rather the mode in which the "varicose fibres."(Valentin,) or "primitive cylinders," (Treviranus,) viewed as the continuation of the nervous tubes, terminate, there has been much discussion.

* British and Foreign Medical Review, October 1838.
† Loc. cit. and British and Foreign Medical Review.
‡ L'Institut, 1838, No. 232.
§ Burdach's drawing of the net-work accompanies the review in the British and Foreign Medical Review.
‖ Nouvelles Recherches sur la Structure de la Peau, p. 17, 20, and 21.



Valentin states that the bundles of fibres of the brain form most beautiful and intricate plexuses, and that on the surface of the cerebrum and cerebellum, in the yellow substance, or the transition substance from the gray to the white, he saw numerous isolated loop-like terminations of the cylinders of the white mass. These "terminating loops" have been seen by Valentin in the horse and pigeon.* No one, as far as I am aware, has verified these important observations of Valentin. Professor Carus† infers the existence of the cerebral loops on physiological grounds, and hesitates not to attribute different functions to the component parts of a loop. Burdach objects to the mode in which Valentin conducted his investigations, and states that he (Burdach) never could see any such loops; at the same time, knowing the difficulty of this inquiry, he would rather not oppose his limited observations to those of Valentin. Henle‡ utters the same sentiments as Burdach, whilst Remak§ believes that Valentin has mistaken the large arches formed by the primitive fibres for terminating loops. With these statements before us, it is impossible to arrive at any opinion regarding the termination of the primitive cylinders of the brain, now acknowledged as the continuation of the nervous tubes. Those who infer from analogy the existence of cerebral loops, instance the great talents of Valentin; those who are opposed to such an arrangement cite the weighty authority of Burdach, Henle, and Remak, and so the matter has been *sub judice.*

The rare opportunity afforded by the present case offers considerable advantages over the dissections that have been made on the brain of different animals, in deciding the points of disputation in the above paragraph. The comparatively soft character of the brain, even in its freshest state, the existence of globules, &c. around the primitive cylinders, the necessity of obtaining the very thinnest section, and the use of instruments which may impair the exact character of the structures under examination, are circumstances which render the inquiry extremely difficult in the hands of the best micrographers. In the monstrosity, on the other hand, the length of the nerves, which were loose or easily isolated, and the readiness with which they hardened in spirits, were favourable circumstances,—in short, there was no difficulty presented excepting the presence of the delicate membrane, and this could generally be

* Uber den Verlauf und die Letzten Enden der Nerven von Dr G. Valentin. (Nova Acta Physicó Medica, &c., 1836, Tomus xviii. p. 92, &c.) If the reader refers to the drawings given by Valentin, (Tab. vii. Fig. 59,) he will observe that the terminating loops of the nerves, as seen in the brain of the pigeon, bear considerable analogy to the arrangement I have described and figured as occurring in the human; allowance being made for the peculiarities which different species of animals are likely to present.
† Müller's Archives, 1839, p. 368. ‡ Encylop. Anatom. Tom. vii. p. 227.
§ Ibid. p. 228.

overcome by well arranged compression. It is a little surprising that no one had conceived the idea of investigating microscopically the nerves of monstrosities in whom the central masses were more or less deficient, for the purpose of ascertaining the termination of the nerves: the anencephalous monsters, for instance, would appear to offer favourable conditions for the inquiry, as the encephalic nerves can generally be seen running into a fungous-looking mass, or, as in others, a membrane covering the irregular and imperfectly developed base of the cranium. Impressed with these views, and desirous of testing their accuracy, I gladly availed myself, during the present summer, of the opportunity which Professor Simpson, with his characteristic kindness, had afforded me of dissecting an anencephalous fœtus. In this fœtus several of the nerves* were traced to the membrane, found in pretty close contact with the base of the cranium, whilst a few were free or attached in such a way that the slightest handling sufficed to make them appear as isolated threads. The microscopical examination of these nerves displayed the terminating loops, as in the previous case.

Conceiving it of greater import to be able to announce the mode in which the nerves terminate in the cerebro-spinal axis of man, I have not deemed it necessary to repeat the observations made by Valentin on the brain of the lower animals; knowing well that the object sought by Valentin in his researches on the pigeon, &c. was to promote our investigations into the human structures, where, owing to circumstances already alluded to, microscopical inquiries are beset with great difficulties. The interesting facts culled from these malformations led me to remember, and at the same time to appreciate, the remark made by Mr Lawrence,† "that we cannot fail to learn something as to the mode in which nature proceeds by attending to the imperfect sketches which she seems to have abandoned as incapable or unworthy of being completed."

My observations have not been sufficiently numerous to allow of any decided opinion being offered as to the primitive fibres of the nerves continuing distinct from the centre to the periphery of the body, at the same time, I may state that these observations made on different nerves of the orbit to the extent of nearly three-fourths of an inch, inclined me to suppose that the component parts of each nervous loop are continued from the central organs, alongside of each other, to the tissue in which they are distributed, here, again, forming a loop, which may be called the peripheral loop. Such a view would be confirmative of the opinion propounded by Valentin, that there is no termination, properly speaking, of the nerves.

It would be injudicious at the present time to hazard any physiological doctrines, based on the anatomical details (however curious and interesting they may appear) which I have recorded in the preceding pages. When it becomes more generally known that the nerves are tubular and contain a fluid; and when, as will shortly be the case, it is received as an established fact in anatomy, that the nerves terminate in the form of loops in the cerebro-spinal axis, and likewise at the periphery of the body, highly speculative doctrines may be expected to flow from the electro-chemical school,—a class of physiologists formerly numerous, and even now at times attractive, but who, happily for science, are gradually retreating from their position, and joining that standard which the philosophic mind of Alison, and the persevering zeal of his disciples have so firmly implanted in the field of physiology.

*Teratological Remarks.*—It is unnecessary to enter into any lengthened remarks on the tumour occupying the occipital region. The reddish-coloured serum was not contained in a number of cysts, as has sometimes been observed,* but in a single bag or sac.† There were no portions of nervous substances floating in the fluid, as observed in Marrigue's‡ case. I forbear noticing the development and formation of this tumour, its probable influence on the cerebral functions, together with other circumstances relative to its history, as tumours of a similar kind are frequently observed in connection with various malformations of the nervous masses.

The exact arrangement of the membranes could not be ascertained. It would appear, however, that the lining membrane of the large tumour had formed a kind of partition between the contents of the tumour and the parts below, as the imperfect spinal canal was not distended with fluid.

Cases, where the brain is absent, as in anencephalous monsters, are frequently met with.

The cases of simultaneous absence of brain and spinal cord (amyèlencéphalie of Beclard) are chiefly recorded by the older authors.§

* The nerves became delicate as they approached the membrane.

† Medico-Chir. Trans. Vol. v. p. 170.



* The existence of a number of these small bags or hydatid cysts, comprising the large tumour, has been occasionally noticed. The character of these is well illustrated in a case of *Nosencephale*, dissected by Isedore St Hilaire and Martin St Angé (Histoire des Anomalies, &c. par Ised. St Hilaire, T. ii. p. 338.)

The late Dr Heysham, the highly talented physician who framed the Carlisle Bills of Mortality, relates the case of an anencephalous female child, in whom life was prolonged for six days, and where a large excrescence, occupying the upper part of the deficient cranium, continued to discharge a thin watery fluid, sometimes tinged with blood during the three or four days preceding her death. This discharge proceeded from the rupture of several small cysts scarcely as large as a nutmeg, the walls of which probably ulcerated and reduced the tumour to nearly one-half its original size. For other circumstances relative to this interesting case which occurred in 1788, see Memoirs of the Manchester Lit. and Philos. Soc. Vol. v. part ii. page 496.

† See a case related by Collins, Practical Midwifery, p. 511.

‡ Journal de Med. Chirur. Pharm. Supplem. à l'anné, 1770. T. xxxiv. p. 53.

§ (De Sed. et Caus. Morb. Epist. 12, 8, &c. Morgagni speaks of Fontanus, Hoffman, Vanhorne, &c. having met with such cases; also Valsalva. In France, Littre, Fauvel, Mery, Burgein, and more lately Andral, (Arch. Gen. de Med., 1826, p. 636,) say they have dissected such cases.

In none, excepting two related by Fauvel and Mery, was life said to be manifested, and, from circumstances to be noticed under the "medico-legal remarks," they cannot be received as authenticated proofs of living amyelencephalous monsters.

The absence of spinal cord (amyelie of Beclard) has been observed by Rusch, Anselin, Malacarne, &c., but as M. Olljvier,* who quotes these cases, will not admit of the existence of an encephalon where the spinal cord is wanting, it may be supposed that in each of these cases there was no portion of the cerebro-spinal axis. That, along with the absence of spinal cord, we may expect a deficient encephalon, if not other considerable deviations in the economy, is fully illustrated in the history of monstrosities, at the same time, I humbly conceive that it would be hasty to infer, as M. Ollivier has done, the absence of encephalon in all cases where the *medulla spinalis* is wanting. The great frequency of the anencephalous monsters has appeared sufficient proof to many of the development of the encephalon being secondary to that of the spinal cord, and doubtless this is the general opinion on the subject. It may, however, be observed that the knowledge which we at present possess of the development of the nervous centres is not so complete or well determined, as to enable us to lay down positive laws regarding the priority of formation of any division of the cerebro-spinal axis. Two cases of absence of spinal cord are noticed by Morgagni,† and have been copied by him from Rayger.‡ They are thus described: "Mihi enim ex binis Caroli Raygeri, observationibus bene pensitatis videtur in duobis maturis fœtibus cerebrum quidem maxime deformatum, sed non destructum fuisse, cum in utroque *spinalis medullæ esset nulla*, aut certe nil nisi sanguis concretus, aut sanguini concreto simile." Whilst we admit the plausibility of the objections urged by M. Ollivier against such observations, where the facts are so briefly stated, there is this much to be said in favour of Rayger, that coagulated blood could hardly be confounded with medullary matter. Whether Rayger has reported the circumstances correctly or not, the monstrosity, whose history I am recording, sufficiently demonstrates the absence of a spinal cord, even where the encephalon was almost wholly developed.

I have in vain searched in the history of monstrosities for an individual case to which the one under consideration might be linked. Multifarious and remarkable as are the malformations of the nervous system, whether these consist in an excess or deficiency, no instance has offered itself where the absence of the spinal cord, medulla oblongata, and cerebellum, was associated with an almost perfect brain. The authorities on this subject, Meckel, Beclard,

* Traité des Maladiès de la Moelle Epiniere, p. 165.
† De Sed. et Caus. Morb. Epist. xii. art. 10, p. 91.
‡ Eph. Nat. Cur. Dec. i., A. 3, and 64 A. 8.



Geoffroy St Hilaire, &c. have not attempted to classify an anomaly of this kind. Such never having occurred in history, there was no necessity for anticipating "freaks of nature;"* whilst not a few, along with M. Ollivier, deny the possibility of such malformations ever being developed.

The absence of a spinal cord entitles the case I am recording to be placed in the *Amyelie* of Beclard, but as the encephalon was imperfect with slight deficiency of cranium and protrusion of the posterior lobes into an hydrocephalic expansion, an *additional* term is required, and perhaps that of *Hydrencephalocele* is the most applicable, and if necessary to have one term *Hydrencephalocelamyelie.*

*Medico-Legal Remarks.*—The circumstances involved in the judicial inquiry instituted on this case, may be discussed under two queries; 1. Had the child breathed? 2. Were the anormal conditions which the fœtus manifested compatible with life?

In reference to the first of these questions, it may be stated that the lungs sank in water, no air could be pressed out of cut portions under water, and their specific gravity, either when entire or divided, seemed much the same as that of so much liver. The *foramen ovale* of the heart was quite patulous, as also the *ductus arteriosus*, both of which had evidently undergone no change from the true fœtal condition. These circumstances afforded sufficient evidence that the child had not breathed.†

The second question was most judiciously responded to in the negative. Dr Oliver stated without any reserve, that in the absence of the spinal cord, and especially that part to which the nerves of respiration are attached, it was impossible that the child could maintain an independent existence. Our present knowledge of the nervous system fully warranted this opinion, nevertheless it is well to be aware that cases of an opposite tendency are recorded, and that these are sometimes adduced as proofs that the nervous centres are not essential to the maintenance of life

* In using the term "freaks of nature," I do not for a moment suppose that the God of Nature is pleased to create organized beings irregular and deformed, but heartily concur in what has been elegantly stated by Chaussier and Adelon, who, after recounting numerous facts relating to the causes of monstrosities in the organized world, conclude thus: "Tous ces faits nous semblent établir que les germes des animaux et des vegetaux sont émanés purs et reguliers de la main du Créateur; enfin, que toute difformité ou monstruosité sont subséquentes et resultent de divers chocs ou dérangemens, ou de l'inégale nutrition, etc, de ces mêmes germes." Dictionnaire des Sciences Medicales, 1819, Tome xxxiv. p. 140.

† The numerous cases lately adduced by Mr Taylor of London and Dr Geoghegan of Dublin, (Guy's Hospital Reports, Vols. v. and vii.) and Dr Joerg, (De Morb. Pulmon. Organico, ex resp. Neonator imperfect orto: quoted in Dub. Journ. Vol. v. p. 36. ;) and Nicolsi, (Brit. and For. Review, July 1843,) &c. ought to be well attended to before the medical man ventures upon a decided opinion in cases of infanticide where the evidence rests in a great measure on the state of the lungs. The medical witnesses in this case had been well aware of the importance of the inquiry as shown in the text.

for a short period. Let us inquire into the validity of these cases. M. Fauvel, in 1701, showed the French Academy of Sciences a fœtus without brain, cerebellum, or spinal cord, but in other respects well-formed and at the full time, which lived two hours, and gave signs of feeling when the water of baptism was sprinkled on its head. The following quotation, which in length exceeds the description given of the fœtus itself, tends to show that the case was not a solitary instance of absence of the nervous centres, so damnatory to the hypotheses then taught in the schools of animal spirits regulating the different vital processes. "Ce n'est par la premiere fois que l'on a vu ce fait, donc on tire une terrible objection contre les Esprit-Animaux, qui doivent s'engendrer dans le cerveau, ou tout au moins dans la Moelle de l'epine, et que l'on croit communement si necessaires à toute l'economie animale."* M. Mery† in 1712, reported a more extraordinary case to the same Academy, of a male child born at the full time without brain or spinal cord, which lived twenty-one hours and took some nourishment. It is added that several parallel instances have been reported, but the references are not given. No one can peruse the history of MM. Fauvel and Mery's cases, without being struck with the extreme brevity of the description; no mention being made of the condition of the nerves of the cerebro-spinal and sympathetic system, or of the form and characters of the cranial and spinal cavities. Numerous other omissions of an important kind sufficiently indicate the extreme carelessness of the description. We must also bear in mind that the above cases occurred at a time when anatomical observations were less accurate and precise‡ than at the present day, and when vague and hastily formed hypotheses, rather than a close scrutiny of physiological phenomena, occupied the minds of the profession. Moreover, other circumstances, which it is not easy to conjecture at this distant period, may have misled the authors,—and the probability of any, or perhaps all of these sources of error prevailing, is calculated to render us very sceptical as to the character of the cases being such as Fauvel and Mery have reported them. In 1730, or about that period, M. Belgrand described a fœtus of eight months, which lived four hours without encephalon and spinal cord. A tumour with serum occupied the upper part of the neck.

* Histoire de l'Acad. Roy. des Sciences, 1711, p. 3. † Ibid. 1712, p. 51.

‡ Detharding, his son, aboeg with Alban, describe a case in the Nov. Act. Nat. Cur. x. part ii. p. 703, where the spinal cord was absent. The only proof they give of this was the introduction of a sound into the spinal canal! M. Rouant, by employing the same means of exploration, was led to believe in the absence of the spinal cord;—a more correct investigation of the canal displayed a spinal cord somewhat less than the normal size! (Histoire de l'Acad. des Sciences, pour 1713, p. 20.) Such cases strikingly exhibit the mode in which anatomical inquiries were pursued, and at the same time confirm the accuracy of the opinions expressed in the text.



It is well remarked by M. Ollivier,* that as the spinal canal does not appear to have been opened below the fourth cervical vertebra, we cannot look upon the case as proving the absence of spinal cord. Another century had elapsed, and though numerous cases of monstrosity, exhibiting marked deficiencies in the central masses of the nervous system were met with at home and abroad, leading to various and highly speculative inquiries as to the purposes fulfilled in the economy by the brain and spinal cord respectively, no single instance occurred where life was sustained for a time without nervous centres, and physiologists had either forgotten the history of, or determinedly set aside as unworthy of trust the cases reported by Fauvel and Mery. In 1833, however, the profession in this country were startled by the announcement that Spessa, an Italian surgeon, had described a child wanting the encephalon and *medulla oblongata*, which had lived eleven hours. A careful perusal of the case† will convince the reader that the greater part, if not the whole, of the *medulla oblongata* was present. Spessa does not mention how the nerves distributed on the organs of circulation and respiration terminated above, or whether or not they were connected with the mammillary portion described at the summit of the spinal cord. Such omissions render the history of Spessa's case very incomplete. The more closely we examine into the details of the cases just alluded to, the more convinced are we that it would be unsafe to infer that any such important phenomenon in the chain of life as that of respiration could be manifested in the absence of a nervous centre, to which the impression *besoin de respirer* could be conveyed.

* Traite de la Moelle Epiniere, p. 164.

† The "Lancet," (January 26, 1833), in quoting the case from the Gazette Medicale, Janvier 15, 1833, as "important and extraordinary," &c. has been a little incautious, as the following extract from their own translation, shows. "Behind the neck arose a nipple-like protuberance, resembling pretty closely the extremity of the little finger." * * The touching of this prominence invariably occasioned an acceleration of the respiratory movements, &c. * * The spinal cord had its *origin* from this protuberance, and *entered* the rachidian canal by an opening situated behind, *between the base of the skull and the atlas.*" Why should Spessa speak of the "rachidian cord and cord itself" if the spinal cord alone had been present.

The Lancet remarks on the case, "it is sufficient for us to mark the all-important physiological fact of the carrying on of the respiration, and the movements of the larynx without the influence of the brain, cerebellum, or *medulla oblongata.*" It is to be hoped the distinguished Editor does not adhere to these doctrines in his present capacity of coroner for Middlesex.

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*Description of the Figures. Plate IV.*

Fig. 6. A washed specimen, exhibiting the simple loops divested of granular matter; the interior of nervous tube containing granules.

Fig. 7. Loops of varied figure; the nervous fasciculus or stem to which they belonged is obscured by the granular matter.

Fig 8. A figure of 8 loop distinct, and a portion of a second loop running in close contact with one side of it and then diverging, is lost in the granular matter; a third passing beneath the two former, and lost to view in the same way. (Magnifying power above 360 diam.)

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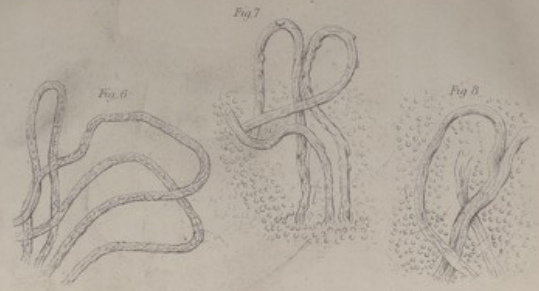
Fig 6
Fig 7
Fig 8

13

# SUBSTANCE

OF AN

# INTRODUCTORY LECTURE

TO A COURSE UPON THE STRUCTURE, FUNCTIONS, AND DISEASES OF THE EYE; COMPRISING A COMPARISON OF THE STATE OF OPHTHALMIC SCIENCE IN GERMANY AND ENGLAND; AND A RECOMMENDATION TO INTRODUCE THE GERMAN METHOD OF INSTRUCTION INTO THE BRITISH SCHOOLS.

By ROBERT HAMILTON, M.D., F.R.S.E.,

Fellow of the Royal College of Surgeons, and one of the Surgeons of the Edinburgh Eye Infirmary. November 1842.

(*From the Edin. Med. and Surg. Journal*, No. 155.)

* * * * *

The value of Ophthalmic science is so great, that the importance of every thing directly bearing on it will at once be conceded. Accordingly, we might have availed ourselves of the present opportunity to introduce a sketch of its past history, which might have proved alike interesting and profitable. This, however, we at present forego, and we do so, from the desire to direct attention to what we consider a more important subject. As the great and ultimate end of all history, whether medical or general, should be to shed light upon our present path, and to afford guidance and instruction in our future course, we shall select one or two branches only of the history of ophthalmic science, and this not solely because they are important in themselves, but chiefly because they are fertile of suggestions which, if properly improved, could not fail, we conceive, greatly to advance the interests of the science in this country. Hence, we shall avoid all consideration of the condition of ophthalmology in remote antiquity, whether as alluded to by Herodotus, or as practised by the oculists of the

Roman emperors: in like manner, we shall pass by such traces as may be found regarding it in the dark ages, and even in more recent times, when the art was so much in the hands of itinerants and quacks. We shall come down to modern times, and even here shall confine ourselves to two localities in which the science has more or less prospered, namely, to Germany, and our own land. We shall glance at its recent history, and shall touch upon its present state in these countries ; considering the steps by which it has attained to the high pre-eminence it holds in the former, and whether there be any sufficient reason why it should be less cherished and less flourishing in the latter. Closely allied to these topics is the all-important subject of education, which may best be regarded in a twofold light, in reference to those who teach, and to those who learn. This most closely affects the pupil and the master, the public seminary and the public well-being ; and hence we shall make no apology for soliciting attention, on the present occasion, to the best modes of teaching and learning that science upon which we are about to dwell, and for recommending the adoption and application of the German method of instruction to the British schools.

We turn then, first, to Germany, more especially to Austria, and to its capital, Vienna, which has long been, as it now is, celebrated for its great pre-eminence as an ophthalmic school. The origin of this celebrity is somewhat variously accounted for, but the leading facts connected with it are these.

It is now nearly a hundred years ago, or in the year 1745, that the celebrated Gerard Baron van Swieten, under the auspices of the Empress Maria Theresa, re-arranged and new-modelled the Medical department of the Viennese University.* This distinguished physician had himself been the pupil of the great Boerhaave of Leyden, who, as is well known, was the master of many of those eminent men who, about the same period, laid the foundation of that celebrity which Edinburgh has now for a long time enjoyed as a medical school. The widely-spread fame of the commentator of Boerhaave, together with the great encouragement at that time afforded to men of science and literature to settle in the Austrian capital, soon attracted thither some of the most distinguished characters in Europe. One of these was Nicholas Joseph Pallucci, an Italian physician, celebrated as an oculist and lithotomist. In the year 1750, he was brought by Van Swieten from Florence, and introduced into the University of Vienna, and may be fairly said, as stated by a recent medical traveller, " to have

* In this sketch, we have freely availed ourselves of the able papers on the subject which appeared in the early Numbers of the Quarterly Journal of Foreign Medicine and Surgery, and which we had occasion to know were from the classical pen of our friend, Dr Mackenzie of Glasgow ; and also, of Mr Wilde's interesting communication in the Dublin Journal of Medical Science for November 1841.



laid the foundation of the ophthalmic school there ; for, although he was not a public teacher, yet the works he published on affections of the eye, and his expertness as an operator, generated a taste for that department of medical science that has gone on increasing to the present day." Pallucci died in 1797. His first work, On a new Method of depressing Cataract, was published in Paris in the year 1750, and probably procured for him that reputation which recommended him to Van Swieten. He wrote other books both upon the diseases of the eye, and on different surgical subjects. But, notwithstanding these labours of Pallucci, it is true, that, in the Austrian capital itself, Joseph Barth is usually considered as the founder of the ophthalmic school, he having been the first public teacher of the science in the Austrian dominions.

Professor Barth was born at Malta in 1745, and studied medicine first at Rome, and afterwards at Vienna. At the age of eighteen, he was appointed Professor of Anatomy to the University, under Störk, the successor of Van Swieten, and at a later period gave lectures upon ophthalmology. He is not much known by his writings on the subject, and, indeed, published but little. He had, however, many pupils who highly esteemed him for his talents and acquirements. The following tradition is still current at Vienna. A lady, attached to the court of the Empress, becoming blind, was pronounced amaurotic by her ordinary medical advisers ; her malady continuing to increase, Baron Wenzel was sent for from Italy, and at once declared the disease to be cataract, and removed it by a successful operation. So amazed was Maria Theresa at this sad display of Austrian surgery, that she forthwith established a special lectureship of ophthalmology, and Barth, in the year 1773, was called to fill that chair. In 1776, he was appointed oculist to the Emperor Joseph II. He long enjoyed this honourable distinction, and died in 1818.

Among the numerous pupils of this first professor we shall here mention four who were pre-eminent, Santerelli, Prochaska, Beer, and Schmidt. To Santerelli, the first of these, is undoubtedly due the original performance of the extraction of cataract by the superior section of the cornea ; a method which is now perhaps the most esteemed both in Vienna and London. George Prochaska held the chairs of physiology and of systematic ophthalmology in the University of Vienna ; and his character, both as a teacher and an oculist, long stood high. While Prochaska taught systematic ophthalmology in the university, his not less distinguished associate, Professor George Joseph Beer, taught practical ophthalmology in the Great Hospital at Vienna, and there attained the highest celebrity. He was first the assistant, and afterwards the successor of Barth, and practised his favourite art with enthusiasm for upwards of thirty years. He commenced as a private teacher about

the year 1798, and from that time till 1815, was allowed, with the unanimous consent of the profession, to be the most esteemed writer of his day, while he was not less distinguished as an operator and an instructor. Lastly, the fame of Vienna, as a school for the diseases of the eye, was greatly increased by Johann Adam Schmidt. He did not belong to the general hospital, nor to the University, but to the Josephine Academy, the school and hospital for the professional men preparing for the Austrian army. He is known most favourably by his ophthalmic writings, as well as by those on other subjects. These men have now all passed away from this fleeting state, and their places have been supplied by others whose fame in no degree falls short of that of their illustrious predecessors. Dr Frederick Jäger was long the favourite pupil of Beer,—he became his assistant, and son-in-law, inheriting his library, preparations, and instruments. He succeeded Schmidt at the Josephine Academy, where his teaching is, at present, one of the greatest professional attractions to the Austrian capital, and his operations are very generally esteemed as the most splendid exhibitions of eye-surgery in Europe. Dr Rigler is now his assistant. He also is engaged in teaching, and is regarded as a man of high scientific attainments, and great manual dexterity. Dr Anthony Edler von Rosas succeeded, upon the death of Beer, to the practical chair in the University, and thus became the clinical instructor in the great public hospital. He disputes the post of celebrity and distinction with Jäger; his writings are voluminous and esteemed; his operations are universally allowed to be in a high degree dexterous, and his knowledge of the history of the science is most extensive and complete. Dr Gulz, an accomplished operator and able writer, was Von Rosas's assistant at the time of our late visit to the school.

Having thus supplied the names of some of the individuals who have most contributed to establish the Viennese school of ophthalmic science, and to support it at the enviable height it now maintains, it is gratifying to add that the Austrian government has not been behind hand in exciting these able men to their labours, and in yielding them all possible encouragement and support; while, at the same time, it has made and enforced regulations which have secured the greatest skill in this department for the benefit of its subjects, and, in truth, have indirectly made Vienna the great cradle of ophthalmic accomplishment and skill.

Imperial patronage, as may be gathered from the preceding details, has been conferred in the Austrian capital upon no fewer than three professorships of ophthalmic science, now, we believe, comprised in two, and in both of these, assistants also are provided, who reside constantly in the splendid hospitals, civil and military, which government also supports. The attendance upon



these courses, on the part of students who seek for the degrees of Doctor in Medicine and Surgery, is made imperative. In the third year of a student's curriculum he must attend the lectures of the professor of systematic ophthalmology in the University; and no practitioner, though possessed of a degree in medicine, can practise publicly as an oculist, in any part of the Austrian dominions, without having undergone a special examination on the diseases of the eye, and having obtained a diploma for this particular branch. "In all the public courses of medicine and surgery, an examination of the enrolled students is held by several professors every half-year, in the presence of one or more of the other office-bearers of the University; and in order to be admitted to an examination for a degree, the candidate must produce certificates of having acquitted himself respectably in three Semestral (six months) examinations; of having completed his fifth year of study; and of having publicly treated within the last half-year, two patients in the clinic for internal diseases, the cases of which patients he must at the same time present to the Faculty, written in Latin." Those students, again, who aspire to the degree of doctor in surgery, or of ophthalmology, must, moreover, have attended the course of practical ophthalmology, as conducted in the great hospitals, the civilians in the civil hospital, the military in the Nosocomium Josephinum.

Our purpose in this survey, as already hinted, is to institute a comparison between the system now under review, and that pursued in this country, and to examine into their respective workings, and the grand result of each; and even from what has been already stated, we might perceive a great contrast in the teaching arrangements, to the manifest disadvantage of our native land. But the grand peculiarity of the German method has not yet been touched upon; and hence we proceed to allude to that clinical method of instruction to which, in truth, Vienna owes nearly all its celebrity. We premise that it differs *toto cœlo* from that clinical instruction which exists among ourselves; and, as from personal observation we entertain a very decided conviction that this method of teaching, well conducted, is, of all others, the most important means of supplying a good education, not in ophthalmic science only, but in all the other practical branches of the healing art, we trust that no apology is necessary for somewhat fully insisting upon it.

Dr Beddoes, in a letter to Sir Joseph Banks, informs us, that the practice of giving regular lectures on the cases of patients under actual treatment, which, we need not say, is the grand characteristic of clinical medicine, was first established at the hospital of St Francis, at Padua, in the year 1578; and our distinguished fellow-citizen, Dr J. Thomson, who has so ably illustrated this as well as many other departments of our science, well remarks, "that the necessity which exists that students of medi-

cine, before leaving the academic benches, to take charge of the health and lives of their fellow-men, should have opportunities of witnessing the practice of physicians of experience and skill, must have become apparent almost as soon as regular schools of medicine were instituted." He adds, "that before the middle of the seventeenth century, the practice of delivering clinical lectures had been introduced into the medical schools of Holland, both at Utretcht and Leyden, at which latter school it was, that at the beginning of the eighteenth century, the practice was so successfully pursued by the illustrious Boerhaave, by whose pupils it was conveyed to other medical schools, and particularly to those of Edinburgh and Vienna." This statement brings us to the point in view, and directs our regards to the great school of this city, (Edinburgh), as well as to that other celebrated university to whose history we again revert.

We regret that we have neither the information, nor the necessary documents which might enable us to supply so minute an account as we could wish of the early clinical school of Vienna. We may state, however, that the medical clinic was united with the general hospital in the year 1784, under the direction of Maximilian Stoll; and we have seen that Professor Barth was appointed to the ophthalmic chair in the year 1773, in which he was succeeded in 1798 by Beer. How far Beer followed the exact method of Barth, we know not; and we cannot expressly say what was the plan of his own earlier instructions, presumable though it be, that one general method, more or less, pervaded the whole. Be this, however, as it may, Beer has himself informed us, that, after fourteen years of private instruction in his art, he laid the design of forming a special ophthalmic clinic before the Emperor. This design was approved of, and a portion of the Imperial Hospital was set apart for treating and teaching eye diseases; and he commenced his duties in this new office in April 1812. Being then but Extraordinary Professor, the students of the university were not compelled to attend his prelections; but men from every part of Europe soon flocked around him to profit by his instruction, and take advantage of the many opportunities which his situation afforded. In the year 1815, the extraordinary was converted into an ordinary professorship of practical Ophthalmology, and attendance then became a compulsory part of medical education.

Without, however, longer insisting upon the history of the introduction of Clinical instruction into the Vienna school, we proceed to describe it as we have ourselves witnessed it, and as it has been depicted by others; premising that, although the Ophthalmic clinic has its full share of pre-eminence, yet it is not confined to this department; on the contrary, the method is maintained by not fewer than five distinct and salaried professors,—two of these being occupied with what in this country has usually been denominated



the Practice of Physic, divided into the consideration of acute diseases and chronic, a third with Surgery, a fourth with Obstetrical Science, and the remaining one with the subject now claiming our particular regard.

Clinical instruction in Germany is given under various distinct forms, of which the *Internal clinic*, and what has been designated the *External* are the most considerable. Not having ourselves witnessed the former of these, which ceases during the vacation, we shall supply a short abridgement of the account given by the graphic pen of Dr Mackenzie, who himself has so much improved the advantages it presents. The visit in the medical clinic occupied one hour every morning. The assistant, who is a graduate, and is styled the *Secundarius*, regularly follows the visit, and, along with those students who choose to attend, visits again in the evening. The duties of the *candidati assistentes*, or students who have the care of the patients, consist in examining the particular patient committed to their care publicly on his admission, and again at every visit; in writing out a *historia morbi*, and in keeping a careful journal of the symptoms and treatment. These cases are not written in a short and imperfect manner; but contain a faithful and minute account of the state of the patients at the last morning visit, at noon, and at evening, with observations in regard to the diagnosis, prognosis, and treatment. The reports are written in Latin, are publicly read at the bed-side, and on the dismission of the patient are delivered to the professor.

The hospital accommodation for the Ophthalmic clinic consists of what is called the *auditorium*, a kind of reception hall into which the new patients are received, and where the professor and students assemble, and of two wards each containing twelve beds. The auditorium is well lighted, and coloured green. The windows are so supplied with shutters and curtains that the light can be in an instant increased or diminished. It affords accommodation during lectures for 150 students, and has a portion of an oval form slightly raised, called the cathedra, whence the lectures are delivered, and where the operations are performed, being large enough to contain a patient, along with the professor, the assistant, and the pupil, to whose care the patient is entrusted. Each of the wards, one for males, and another for females, is about the size of the auditorium, is also coloured green, and contains twelve beds. Frank, at Pavia, had rarely above eighteen patients in his medical clinic; and it is important to note that this limited number is essential to the success of the system.

The instruction in the ophthalmic, as in the other clinics, is continued uninterruptedly for ten months. The lectures on practical ophthalmology are delivered every morning, Saturdays and Sundays excepted, from ten to eleven o'clock, comprising first the

anatomy and physiology of the eye; then a few lectures on the manner in which the eye should be examined; next on the pathology of the organ, and the medical and surgical treatment of its diseases, the whole concluding with the history of Ophthalmology. Daily, again, from eleven o'clock to twelve, Saturdays and Sundays included, the strictly practical instructions are given, partly at the bed-sides of the patients, and partly in the review of the out-patients who apply for relief. Every new and interesting patient, whether he is to remain or immediately to depart, is brought into the auditorium, and placed in the cathedra. One of the students now presents himself as the assistant or ordinarius for the patient, and undertakes the examination of the case under the correction of the professor.

This last statement brings into view what is called the *External clinic*, and which consists of nothing more than the adaptation of the clinical method of instruction to the treatment of the out-door patients of an hospital,—the number, at the same time, being kept small. With the existence of an hospital, however, it has no necessary connection, as it may often be witnessed in operation, when the internal clinic, as during vacation, is closed. In these latter circumstances, again, it corresponds in many particulars with our dispensaries, and might most readily and advantageously, with a little management, be carried on in some of these institutions. In the north of Germany this system is usually designated by the name of *Polyclinic*, as the number of out-patients who present themselves usually much exceeds the number of in-patients; whilst another name it receives is that of *Ambulatorium*, from the applicants making it their business to come at regular hours, and retiring again as soon as their prescriptions are prepared, and their medicines delivered. Professor Chelius informed us, that at Heidelberg a list of the students who engaged in this duty was kept, and that they took the cases which presented themselves, very much in rotation, the privilege being restricted to those who were considered equal to the responsibility. With a new patient, the *Ordinarius* next in turn presents himself before the professor and his fellow-students. He immediately commences his examination; the professor, at the same time, by such inquiries as he deems necessary, satisfying himself of the nature of the case; the bystanders also examining for themselves, and narrowly observing all that passes. This done, the professor demands of the ordinarius the nature of the complaint before them; and, if a wrong answer is given, tries, by some leading question or hint, to make the pupil correct himself. The disease at length ascertained, interrogatories are put respecting the diagnosis, prognosis, and *methodus medendi*, and the treatment to be adopted being agreed upon, the assistant withdraws the patient from the circle, so making room for a fresh case. He then enters the name of his patient in the register, with the name of the disease, the prescriptions, &c.; and furnishes the patient with the receipts for the various medicines he orders, previously bringing them to the professor who, on finding them correct, or animadverting upon them when necessary, signs them for the apothecary. If the case be surgical, and requires dressing, or some minor operation, this is immediately done, sometimes by the professor, and often by the pupil under his eye. At all future visits, the same student continues to take charge of the same patient, and thus watches over all the phases of the disorder for better or for worse.



In addition to these two principal clinics, Internal and External, a third must be added, which has very properly received the name of *House clinic*. It owes its origin to the fact, that most of the ophthalmic professors in Vienna are in the habit of having, in their own dwellings, a set hour for the reception of patients among the middle and humbler classes of society, to which their private pupils always have free access, and to which strangers are usually invited. Many of the less severe diseases of the eye may here be observed; the professor's treatment is fully exemplified, and many hints, and much familiar advice is supplied.

One other mode of instruction which prevails at the Vienna school, though not strictly belonging to the category, must not be passed over, known by the name of *Privatissima*. The ophthalmic privatissimum consists of a short course of the operative surgery of the eye upon the dead subject, wherein the professor performs the different operations, and explains, as he goes along, every step and minute point in their performance, after which, he directs the pupil in the repetition of each of them. After attending one of these private courses, the pupil is allowed to operate upon the living subject. Each class of this most useful instruction is confined to about six pupils, and the most eminent professors of the art, such as Rosas, Jäger, and their assistants, are now in the habit of conducting them.

The practical results of this system of instruction are altogether such as a careful study and examination of it would naturally lead us to anticipate. Hence, respecting ophthalmology, it is a fact, that from this school there has emanated a host of men who have trodden in the footsteps, and many of whom in every way rival the high character of their respected masters, and who now, in their turn, and in other spheres, have become centres of attraction and information. Thus the benefit has been spread very generally over Germany. It is in this way, that we almost everywhere find names that are highly venerated in the science,—names such as Fischer at Prague, Walther, Schlagintweit, and Stromeyer at Munich, Chelius at Heidelberg, Von Ammon at Dresden, Ritterich at Leipsic, Jüngken at Berlin, and many others it would be te-

dious to enumerate. Hence the high and forward state of the science in that country, and the great number of expert and accomplished oculists. And passing from this to the other practical branches of the healing art, whenever this clinical system is brought into operation, there the best results are found to follow. It is useful not more to the taught than to the teacher; and witnessing it with delight, in daily and active operation, at such places as Bonn, Heidelberg, Vienna, and Berlin, under the most experienced and sagacious professors, we could not repress the wish that it should be forthwith introduced wherever good and substantial education was desiderated for the credit of the profession, and the well-being of the community.

Having now endeavoured to furnish a slight sketch of the recent history, and present condition of ophthalmic science in Germany, and this in connection with its system of clinical instruction, we turn to Britain, and here, avoiding alike partiality on the one hand, and prejudice on the other, would make a corresponding survey.

The first observation which suggests itself is, that Britain was not without its share of those self-styled oculists who everywhere endeavoured to monopolize practice, and, till a late period, were a disgrace to the profession. Among these the most famous for several generations, we are informed, was a family of the name of Taylor, one of whom gives the following amusing account of himself. After curing all that were curable in his native country, he travelled to the continent, and there maintained a splendid equipage, his carriage being drawn by four horses gaily caparisoned, and attended by many out-riders; the pannels of his carriage were painted all over with eyes, to denote his profession, and his assumed motto was "*Qui visum dat, vitam dat.*"*

Britain, however, does not seem to be of all others the most congenial soil for charlatans; or, at all events, we may congratulate ourselves, that, from an early period of English surgery, many authors set themselves to oppose and banish quackery, and become good oculists, while they were, at the same time, learned and able surgeons. Thus Richard Banister, who wrote an excellent work on the Diseases of the Eye towards the commencement of the seventeenth century, designates himself Master in Chirurgery, Oculist, and Practitioner in Physic; and wishes his reader to understand, that his special breeding had been in the general skill of surgery. He tells us that, in the methodical practice and cure of blind people, by couching of cataracts, our English oculists had always a special care, according to the art, to couch within doors, out of the open air, to prevent further mischief; while some of the mountebanks take their patients to the open market, and there, for vain-glory's sake, make them see, hurting the patients only to

* See Mr Middlemore's Treatise—Introduction.



cause the people wonder at their rare skill. In early English surgery, we have the respected names of Wiseman, Turner, and Cheselden, whose works testify that they were practically acquainted with ophthalmic maladies, and attended to them in common with other diseases. To the same highly respectable class belong the names of Pott, Hey, Ware, Saunders, and Wardrop; to which have succeeded, in the present day, many more who now enjoy a proud and well-merited celebrity.

It was not until the year 1805, that the Metropolitan institution, now designated the Royal London Ophthalmic Hospital, was founded for the especial treatment of eye diseases; and this, so far as we know, was the first establishment of the kind formed in the kingdom. The original intention was, that it should be a dispensary only; but the addition of an infirmary, in other words, of accommodation for in-door patients, was soon conjoined, and has been maintained to the present time. The late John Cunningham Saunders had the honour of being its founder; and his eminent success and valuable works give sure pledge that, had his life been prolonged, he would have proved one of the most successful improvers of the art. From the first he was assisted by the now venerable Dr Farre, who, for a long term of years, has done much for the advance of the science; and he was succeeded by Messrs Lawrence and Travers, two valued names, which are an honour to the profession. These gentlemen have been succeeded by the present officers of the establishment, who, especially Messrs Tyrrell and Dalrymple, by their writings as by their skill, have greatly distinguished themselves.

Much about the date of the founding of this hospital, another sprung up in the metropolis, which is now known as the Royal Westminster Ophthalmic Institution, and which Mr Guthrie superintends with so much credit to himself and benefit to the public. Nor, though later as to date, must we omit, as associated with the London school, the beautiful institution connected with the splendid establishment of Guy's, known under the name of Guy's Hospital Eye Infirmary, ably conducted by Mr Morgan, and in which we have a specimen of what may be done by private benevolence; and where, in fact, is all the machinery of what, if properly worked, might constitute an efficient ophthalmic clinic. To these we have still to add, the Cork Street Eye Dispensary, a private establishment, which the well-known, expert, and fashionable oculist Mr Alexander superintends, and to which, we believe, Mr Alexander Junior is assistant-surgeon; and the North London Eye Infirmary, which was founded in January 1842. Establishments of this sort were found so useful, that they soon began to spread from the capital into the provinces. Sir William, then Mr Adams, speedily founded one at Exeter, well known under the name of the West of England Eye Infirmary; and there now exist, in the southern parts of England,

one at Bath, instituted in 1811; one at Bristol, a dispensary, founded in 1812, and ably conducted by Mr Estling; and a third at Plymouth. About twelve or fourteen years ago, an Eye Infirmary was established at Norwich, conducted by Dr Evans, and Mr Hull (now M. D.); and which is productive of great benefit to the public in the Eastern counties. In the great towns of the north, many flourishing institutions of this sort are to be found. Thus there is the Birmingham Eye Infirmary, where Mr Middlemore exercises his skilful benevolence, having six beds for in-patients, whilst more than 2000 appear annually as out-door patients. At Southam, in Warwickshire, there is an Eye and Ear Infirmary, which was established in 1818; and in York an Eye Institution, with the particulars of which we are not familiar. At Leeds there is an Eye dispensary, where Messrs Nunneley and Braithwaite officiate. At Manchester there is an excellent Eye hospital upon the same general plan, and having about the same extent of accommodation and number of patients as the Birmingham Infirmary. Here Messrs Hunt, Brown, and Walker have distinguished themselves. At Liverpool there are two institutions of this kind, and at Newcastle one; and, to come to Scotland, there is an admirable Eye Infirmary at Glasgow, provided with twelve beds, and furnishing advice and medicine to about 1200 or 1300 out-patients annually, by the able hands of Dr Mackenzie and Professor Rainy; whilst in Edinburgh we have two Ophthalmic institutions, the one, the Eye Dispensary, which owes its origin in the year 1824 to the energy and benevolence of Dr J. A. Robertson, and the other, a small infirmary, which Dr Watson had the merit of founding in 1834.

These are all the ophthalmic institutions in Britain of which we have procured intelligence; and now, we turn with pleasure to the sister island, where the names of Hewson, Carmichael, Jacob, Wilde, and others are familiar to the ophthalmic student. In the Irish metropolis, Dr Jacob, several years ago, established the Pitt Street Eye Dispensary, which is now removed to the City-of-Dublin Hospital; and Mr Wilde, two years ago, instituted the Frederick Lane Dispensary for Diseases of the Eye and Ear, which he has since efficiently maintained; whilst two wards have long been appropriated to the treatment of eye cases in Stevens' Hospital. To these establishments, the eye first and naturally turns, for those facilities which are required for teaching that salutary art which they are engaged in administering; whilst, at the same time, we are far from overlooking our larger and richly endowed general hospitals, which, failing the other class of establishments, receive the cases of eye diseases into their wards, where much skill and address are exercised in their treatment.

The question, then, here naturally suggests itself, do these excellent institutions, whether general or particular, supply those opportunities which are desiderated for the efficient teaching and learning of ophthalmic science? or rather, are the opportunities which they afford any where made available to an extent that is in any degree satisfactory or sufficient?



It is impossible to cast a glance at any of these institutions without having it forced upon our conviction that they were primarily and especially intended "for the relief of the afflicted poor;" and that any thing which interferes with this benevolent purpose is not only an incumbrance but an injury. In their practical working in all our larger cities, if at all well conducted, the number of applicants is great; the time required for each is considerable, and must therefore be limited to what is absolutely required for the exigencies of the case. From 1000 to 2000 patients per annum constitutes the average number in our provincial establishments, and where the hospital is opened four days a-week, supplies from five to ten new cases daily, besides the many scores of old ones, which crowd regularly to receive the benefits of the charity. In a word,—with his steadiest exertion, and with all that quickness and tact which practice alone can give, it occupies a surgeon not less than one or two hours, and sometimes more, in the unceasing task of examining and prescribing, and ere his work is performed, with the strictest attention to point and promptitude, the time of the visit is elapsed, the convenience of the applicant is compromised, and his own powers are fatigued and exhausted. In the Royal London Ophthalmic Institution, where last year upwards of 6000 patients were admitted, and who have regular access to the institution four times a-week, the daily visitors, new and old, amount to many hundreds; and though two medical officers at a time afford their gratuitous and invaluable services, yet several hours necessarily elapse ere their weary task is fulfilled.

We mean not to affirm that no profit arises to the profession from this exercise of their benevolent skill in ophthalmic establishments and in great general hospitals. A benefit accrues to the assiduous medical officer, who is here presented with a large field of practice, which cannot be cultivated without a rich return; and the writings of Lawrence, Travers, Mackenzie, Guthrie, Tyrrell, Middlemore, Watson, and many others, abundantly prove that these gentlemen have worked for their own improvement, as well as for the benefit of the science. Nor do we deny that the devoted pupil also, who enters himself at one of these establishments, by patience and prompt seizure of passing opportunities, derives benefit. But this is only by the way; and his presence, interrogations, and manipulations, are generally out of place, and a source of annoyance to the patient.

It is, however, not less true, that though the relief of the poor patients be the primary object of these benevolent establishments, it need not be the only one; and existing where medical schools

and universities are established, there should be no difficulty in making arrangements of such a nature, that while one class of the applicants should receive all possible professional attention, another set, without suffering detriment in this point, should be made available for the scarcely less important ends of medical instruction. For this purpose, some plan corresponding to what has been above described as the External or Internal Clinic of Germany, should, as of necessity, be adopted; the patients would require to be limited as to number; so, likewise, would the students, who must needs be of a class which had made considerable progress, and were ripe for engaging in practice; and finally, the practitioner would require time, and, being free from bustle and perplexity, should have opportunity to address himself, not merely to the relieving of the patient, but especially to the instruction of the pupil.

But leaving in our rapid survey the Eye hospitals of Britain and Ireland, let us turn to her Seminaries of medical education, and inquire what provision they make for ophthalmic instruction.

We have now many local and provincial schools scattered throughout the country—too many, we fear, for the purposes of substantial and extensive medical instruction; and Birmingham and Manchester, according to our information, of all these schools, are the only ones where instruction upon Ophthalmology is afforded. Turn we now to our metropolitan cities and universities, inquiring, how stands the matter in them? We learned lately in London, that there was no distinct course of lectures upon the subject given there at any of the schools, nor at either of its colleges; nor was there any immediate prospect of such a course being provided. Dublin is decidedly more fortunate; for there both Dr Jacob and Mr Wilde are in the habit of delivering courses of lectures on ophthalmology; the former in the Baggot Street City-of-Dublin Hospital, and the latter in the School of Medicine and Surgery, Park Street; whilst in Scotland, Dr Mackenzie has for many years been in the habit of giving a full and regular course within the walls of the college at Glasgow; not, however, be it noted, as one of the professors of the university, but as Waltonian lecturer only: and in Edinburgh, the late Dr Hunter, whose promising talent excites the deeper regret for his early death, gave several regular courses on the subject of Eye diseases; whilst my friend, Dr Robertson, has been in the habit of giving prominence to this branch in his lectures upon Surgery.

From all this, then, it would appear, that, with the partial exception of Glasgow, no chair for teaching ophthalmic science exists in any university within the British empire; a sad blank, which can only be very partially supplied by the professors of Medicine and Surgery, however ably they may handle their respective and extensive branches; and which we have reason to know is to an extent rather to whet than to satisfy the appetite. In filling up this slight sketch of the state of ophthalmic instruction in Britain, we



need scarcely add, that the government of the country, or rather the Crown, has done nothing to supply, what we now venture to characterize as a very great and decided deficiency.

We have still to insist for a little upon Clinical lecturing; a practice which, as before observed, was pursued by Boerhaave at Leyden, and was introduced by his pupils into the schools of Vienna and Edinburgh; and we shall now venture to revive the recollection of its history in this great seminary, mainly in the strong and masculine language of the late Dr Gregory. "Dr John Rutherford, the original professor of the practice of physic in this university, had the merit of beginning the medical clinical lectures, and had them all to himself for seven or eight years; but as soon as he found that some of his colleagues chose to undertake them, he withdrew from them. For some years afterwards, Dr Monro *primus*, Dr Whytt, and Dr Cullen, had the clinical lectures among them. From 1766 to 1773, all the time that my father was professor in this university, he and Dr Cullen had the winter clinical lectures between them; during which time, not more than one or two summer courses were given, and these by Dr Francis Home only. Soon after my father's death, Dr Cullen's family prevailed on him to withdraw from the clinical lectures, perceiving that this labour, in addition to his other, was too much for him. Drs Plummer, Alston, Monro *secundus*, Black, and John Hope, would never take any share of the clinical lectures. When I was appointed professor of physic in 1776, not one of the senior professors, Monro, Cullen, Hope, Black, would take any share of them: of course they fell to the share of the two junior professors, Dr F. Home and myself, and we had them entirely between us two for fourteen years. I had the merit of prevailing with Dr Daniel Rutherford to take share of these lectures, though I found it no easy matter to accomplish; nor do I believe I should have succeeded, and I certainly should not have continued to take share of them myself, if the labour had not been made lighter, or at least less frequent in its return, by our junior colleagues, Drs Duncan, Hope, and Home sharing it with us. Though I have bestowed much good advice upon him for this purpose, I have not yet prevailed on Dr Monro *tertius*, to take any share in these lectures. The plain truth is, that they are so severe a labour, both in point of attention and time, that all of us feel them very irksome, even though our time of attendance is but three months; and as clinical lectures cannot be prepared before hand, as those on every other branch of physic may be, and ought to be, the incessant drudgery of preparing them from day to day, and the consequent interruption of all other study, and much other business, is often very inconvenient, and sometimes quite intolerable."

In addition to this statement of Dr Gregory, it must be mentioned, that he himself ceased to deliver clinical lectures for many years before his death, and that they were then maintained by

four of the members of the Medical Faculty in rotation; and that during the whole of this long period, extending to well nigh a century, this right to deliver clinical lectures in the university was not dependent, to use the words of Dr Thomson, "upon any direct appointment given by the Crown, or by the patrons of the university, or by any rules or regulations embodied by the patrons in the commissions of the professors which they nominated, but on a private arrangement between the Senatus Academicus, and the managers of the Royal Infirmary, in consequence of which, each member of the faculty was entitled in his turn to take the medical charge of certain wards in the hospital, and to deliver lectures on the cases of the patients which they contained."* To this we have only to add that, in the year 1803, the Crown appointed the late Mr James Russell to the Regius Professorship of Clinical Surgery, a chair which is now ably filled by Professor Syme; and in the year 1829 the managers of the infirmary, in the exercise of their own powers, authorized the senior physician and senior surgeon in attendance, and whether members of the medical faculty or not, to deliver clinical lectures; which, though not recognized by the Senatus Academicus, are so by the Royal College of Surgeons of Edinburgh, and by most of the other medical boards.

Such, then, is the history and constitution of the clinical lectureships established in this school; and as to the nature and extent of the instruction afforded to the pupils, we need scarcely say any thing, as most of those we now address have had personal experience of its working. One or more wards are assigned to the clinical teacher, into which he admits such patients as best suits his purpose; these are visited by him and his pupils once a-day at the regular hours of visit; their cases are carefully drawn up by his clerks, and the pupils are permitted to copy them into their own case-books. The successive daily reports may be added at each visit, as they are dictated at the bed-side of the patient by the professor or teacher. To see and hear the professor examine and prescribe is all that the pupil, generally speaking, has to do with them, though he may frequent the wards during the intervals of the visits. Two clinical lectures are given each week, when the teacher explains the nature of the cases, and the rationale of the treatment, with such other remarks as appear to him best calculated to illustrate the disease. That this has been, and is still useful in its way, we mean not to deny; for what system, worked by such men as Monro, Cullen, and Gregory, could fail to be beneficial, and to command celebrity? But, notwithstanding, we contend that in many respects it is defective; its style is still essentially didactic; all its value emanates from the teacher, and may never reach the perception, nor excite either the attention or the energies of the pupil; in these respects it differs wholly from the clinics of

* Additional Hints respecting the improvement of Medical Instruction in Edinburgh University, 1826.



Germany, which, though they may have originally sprung from the same source, have eventually taken a different direction, and assumed an essentially different character.

This conclusion appears so clear and undoubted, that now, in again adverting to the great matter in hand, viz. the best mode of teaching the practice of the healing art, and of conveying instruction in the ophthalmic, as well as other practical branches, we consider any laboured or formal comparison of the two systems and schools as in actual operation, in their respective localities, as altogether superfluous. *1st*, In Britain, the system has received no royal, no government patronage; *2d*, It has received no university protection in the schools generally, not excluding Edinburgh; *3d*, There is no professor of Systematic ophthalmology; *4th*, There is none of Practical ophthalmology; and attendance upon such courses is necessarily nowhere made imperative; *5th*, As a recognized part of the school, there is nowhere an Ophthalmic hospital, nor ophthalmic wards; *6th*, There is no Internal clinic; *7th*, No External; and *lastly*, no Privatissimum; and hence, those pupils would, indeed, greatly deceive themselves,—as would their friends and advisers,—or would be endowed with powers altogether extraordinary, who, destitute of those rare advantages which attract professional men from every part of the world to Germany, would for a moment suppose that they are as well without them, and are placed in circumstances as favourable as they could desire. Edinburgh has had its clinic, and has greatly profited by it. But is that clinic perfect? Is it unsusceptible of improvement? We believe not; as contrasted with Germany, it is, in various particulars, wofully behind; nay, it is wholly deficient. She has altered and improved in other matters; we would urge her, as she values the stability of her high character,—and the same advice we would extend to other medical seminaries,—to improve in this important particular. If one does not, another will, and will reap the benefit. To feel the full importance of the mode of instruction we advocate, it may require, perhaps, to be seen as well as described; but it should not be difficult to picture to one's self a man properly qualified and selected; such a man as a Chelius, a Jäger, a Dieffenbach, and many more, thus receiving at once his patient and his pupil,—to observe his whole carriage towards both, bland and yet business-like, kind and judicious; to notice the promptitude,—the kind of instinctive glance with which he recognizes the character of the malady,—with which he certifies himself of its real nature, the address with which he uses the appliances of his art, marks their effects, watches the result, and, with the case actually before them, initiates his eleve into all his skill, from day to day, from month to month. We fain hope that no one inclines to regard us as too urgent or importunate in this matter. In case they do, however, we corroborate our convictions with the sentiments of other and wiser men. "Clinical lectures," says Sir James Clark, "form the most important branch

of instruction in the whole medical curriculum, as far as regards the pupil, and the most difficult as it respects the professor."* "In France," says Dr D. Johnston, "and perhaps even more in Italy and Germany, clinical instruction forms the most important part of general medical education."† And once more, Dr J. Thomson, who has given much of his attention to the whole subject, declares that "clinical teaching is the most important and difficult duty in which a teacher of medicine can be employed."‡

Since these pages were penned, we have come to the knowledge of various movements for the promotion of the objects here recommended, which, far from damping our feeble efforts, would only excite us the more, until the beneficial object shall be accomplished. We have been recently informed, that, of the recommendations which were embodied in the report presented by his late Majesty's Commission for visiting the Universities and Colleges of Scotland, one was, that there should be appointed a Professor of Clinical Medicine, whose office and duties should be permanent,—an appointment which could scarcely fail to advance the plan here recommended. We have also learned, that, a few years ago, one of the Patrons of the Edinburgh University, laid on the table of that honourable board, a motion to the effect, that the patrons should institute a chair for the purpose above stated; which motion, however, was not prosecuted at the time. Again, although no hospitals nor lectures for instruction in Ophthalmic science are anywhere provided by the universities and great medical schools, and consequently cannot be enjoined upon any, yet, in the printed Regulations of the Army Medical board, we read, "that it will be considered an additional recommendation to the candidate to have attended an establishment for the treatment of diseases of the eye;" while in the corresponding official document of the Navy Board, it is declared "that a preference will be given to those candidates for the service who, by possessing a knowledge of the Diseases of the Eye, appear to be more peculiarly eligible for admission to the service." That a corresponding feeling, induced by these regulations, and by like honourable motives, widely pervades the class of students is manifest from the complaints which we have frequently heard expressed, that no adequate provision has been made for teaching this department; and is still more demonstrated by the fact, that, in the year 1833, a petition was prepared and numerously signed by the medical students and graduates of the University of Glasgow, and by them presented to the Honourable the Senatus Academicus of that institution, in which, among other important suggestions, they petition, "that, with a view to fill up what they consider desiderata in the medical curriculum, they respectfully entreat the honourable and learned Senatus to render imperative upon future graduates a course of classes in addition to those specified in the late

* Observations on the system of Teaching Clinical Medicine in the University of Edinburgh, 1827.

† History of the present Condition of Public Charity in France, 1829.

‡ Loc. cit., p. 38.



public regulations, amounting to six, and one of which was upon the Diseases of the Eye."

Gentlemen, having lately, with the highest satisfaction, had an opportunity of witnessing the operation of the admirable system of instruction upon which we are now dwelling, and having, moreover, we hope, somewhat profited by it, we trust we may stand excused, if we feel solicitous that the knowledge of it, and the benefits accruing from it, may be spread as far and wide, and as rapidly as they are found really to deserve. We forget not how little it is that can be accomplished by the individual who now addresses you; but that little he would not leave undone. He can avail himself of such an opportunity as that you have now so kindly conceded; and can request you to give your attentive consideration to the subject. Had he the honour of gaining for a moment the ear or attention of any of the more leading and influential members of the profession,—any of those who so laudably exert themselves in the great subject of medical education and qualifications,—he would particularly solicit their attention to the matter. Did they at all see it in the light in which it has been regarded by many most competent judges, then, in their intercourse with our statesmen and legislators, they could scarcely fail to suggest afresh, because it is not for the first time, that there is a form and method in which, at a very small pecuniary outlay, and by judicious patronage, they could not fail to act, without conferring a great boon upon their country, and an honour upon themselves. In their intercourse, moreover, with the Honourable Patrons and Governors, or Directors of our Universities, they might suggest to them that here was a mode, it might be wholly free from expense, in which they could greatly advance the prosperity of the seminaries under their charge; and once more, there is another class, consisting of our Senatuses and Professors, and still more, our Managers of hospitals, who, by them, might effectually be urged to recognize the pressing and vital importance of these simple means of genuine clinical instruction, in carrying forward the great and benevolent objects they are associated to promote.

In my own most limited sphere, again, having assumed the highly honourable and responsible duties of a teacher, I would anxiously endeavour to afford something like a specimen of what is here so earnestly recommended; and I feel grateful that arrangements have been made which afford great facilities for the execution of the plan.

* * * *

In conclusion, Gentlemen, notwithstanding our high estimate of the value of the plan we have attempted so imperfectly to sketch, and of the importance of its introduction into this country and school, it is not without many anxious feelings that we adventure upon the somewhat novel, most difficult, and important course. We do indeed entertain a very deep and most sincere conviction of our own incompetence to do full justice to the task. If the

plan fail, we are convinced this will result, not from the badness of the cause, nor from any defect in the importance and excellency of the scheme, but solely from the incompetency of him who undertakes it. Should it unfortunately be our lot to be disappointed in our hopes, we believe it will be in a good cause; and though success may not attend our labours, we doubt not that, under brighter auspices, and in abler hands, the object will one day be accomplished, it may be here, it may be elsewhere, to the joy and gratitude of many a thankful recipient of its benefits.

*Postscript.*—Since these pages were printed the following important particulars have been kindly brought under our notice. In the introduction to Dr Graves' valuable System of Clinical Medicine, published in 1843, a short account is given of the German system of clinical instruction, to which we beg attention; and we are informed that Dr Graves introduced the system into the Meath Hospital, in Dublin, as far back as the year 1821. We must, however, request that the Doctor shall be himself heard. "Eleven years experience enables me strongly to recommend the method of instruction pursued in Germany. Since my appointment to the Meath Hospital, I have had extensive opportunities of observing its good effects. No session has elapsed without furnishing proofs in its favour." And again, in a postscript, dated 1842, he remarks, "twenty-one years have elapsed since the preceding lecture was delivered in the Old Meath Hospital, and my subsequent experience has amply verified the opinion I therein expressed." (P. 10, 11.) Again, we have recently received a letter from a kind correspondent in London, who writes, It is intended, at the * * to give a full course of ophthalmology this spring, (1843.) Anatomy, physiology, optics, as applied to vision, general and particular pathology, and the surgery of the organ, will be the subjects treated by the various officers. We shall adopt the plan of the external clinic, with the exception of not permitting (at present) the pupils to take charge of the patients. We think this would be attended with great difficulty here, where we cannot compel the necessary attendance and punctuality of pupils, or out-patients.—And once more, Mr Wilde has done us the favour to state that during his course of lectures in Park-Street School, during the current spring, he purposes giving practical instruction in it after the Vienna method. All this, together with the interesting coincidence that Dr Bennett has, this session, commenced a course, after the fashion of the German clinic, in connection with the Edinburgh Royal Dispensary, bids fair, we trust, for the speedy introduction of that mode of teaching which is considered by so many as the most useful and the best. *

* See additional information in a highly interesting Biography of Dr Graves in the Dublin University Magazine for Feb. 1842, p. 260.

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# ON PANNUS;

AND THE

## CURE OF INVETERATE CASES BY THE INOCULATION OF THE MATTER OF BLENORRHŒA.

BY ARTHUR B. STOUT, M.D.

COMMUNICATED BY DR HAMILTON TO THE MED.-CHIR. SOC. OF EDINBURGH.

(*Extracted from the Lond. and Edin. Monthly Journ. for July* 1843.)

As announced in the title, the Society will observe that it is indebted for this communication to Dr A. B. Stout. In my short sojourn, last autumn, in the Austrian capital, I had the pleasure of making the acquaintance of this intelligent citizen of the United States, who, much impressed himself with the importance of a new cure for inveterate pannus, engaged my services to introduce the subject to the favourable notice of the profession in this country. For this purpose, he put into my hands various notes he had in his possession, and which embodied a short account of the recent experiments and observations of Dr Jos. Fr. Piringer, the well-known surgeon and oculist of Gratz; and of the still more recent ones of Professor Jäger, his much-esteemed master at Vienna. These notes were not in a state fit for publication; neither were they drawn up with an express reference

to the present doctrines and practice of British surgery; and were so thoroughly German in their tone, that they would not always, and at once, have been very intelligible to an English reader. I have thought it advisable, therefore, to recast and remodel them as best I could, combining with them such prefatory and explanatory matter as seemed necessary. The paper must thus be considered as a joint production; and while I stand responsible for the humble task of compiling, the novel and important facts regarding the method of cure are due to my respected friend Dr Stout.

It has been well observed by Beck,[1] that the nature and character of pannus has been very variously understood and explained by different authors,—a remark quite as applicable to British as foreign authorities,—and hence it must be our object first of all, to attach clear and definite ideas to that morbid state of parts which, in the science, is correctly designated by the term.

By many of the older authors, and by several modern ones, the term pannus was regarded as synonymous with pterygium, under one or other of its modifications. Banister,[2] Ettmuller,[3] and Heister,[4] as in the words stated in the notes below, all seem to have regarded it as identical with the *pterygium crassum;* Scarpa, incorrectly it would appear, considered that the ancient physicians meant by the term the union of two or three pterygia near the centre of the cornea;[5] while among living authors, Mr Wardrop,[6] and Dr Watson,[7] regard it as synonymous with the *pterygium tenue*, in direct opposition to the sentiments of the older authors stated above, and of Purmanus, who rightly states that by the term the ancients designated the pterygium crassum.[8] All these applications of the word should certainly be abandoned.

By many, perhaps by most British authors of the present day,

[1] Beck, Handbuch der augenheilkunde. Heidelberg, 1823.

[2] Apud Middlemore. Treatise on the Diseases of the Eye, i. 367.

[3] Interdum est (Pterygium) carnosius et tunc dicitur pannus. Ib. 366.

[4] Sed subinde mollis atque rubida (ungula vel Pterygium) propter copiosissimas venulas, eadem apparet; adioque tum pannus solet apellari. Institu. Chir. cap. lvii.

[5] In some cases two or three pterygia of different sizes are met with upon the same eye, placed at different distances from each other, round the circumference of the ball, with their apices directed to the centre of the cornea; where, if unfortunately they unite together, they cover the whole of its surface with a dense veil, and produce a complete loss of sight. This complicated case appears to me to be precisely what the ancient physicians have called the pannus of the eye. (Briggs' Translation, p. 257).

[6] This new formed membrane constitutes what has commonly been denominated the membranous pterygium or pannus. Morb. Anat. of the Eye, i. 24.

[7] Pterygium may take place at several sides of the eye; but most commonly only at one; or it may extend over one half of the eye, like a thin web, which has been termed pannus. Compend. of Diseases of the Eye, 3d edit. 1830, p. 226.

[8] Men of sense and experience only make this difference, viz. that which is white and thin they call *unguis* or *pterygium*, and that which is thicker, and intermixed with blood from injected veins, and looks fleshy, they call pannus. Chir. Cur. p. 67.



pannus seems to be regarded as synonymous with a vascular and obscure condition of the corneal conjunctiva only. In proof of this, we quote beneath the words of Messrs Samuel Cooper,[1] and Tyrrell,[2] Drs Littell,[3] and Stoeber,[4] and of an able writer in the *British and Foreign Medical Review* for July 1840.[5] To these statements we invite perusal, under the clear conviction that they support the affirmation that the current definition of pannus at the present time, is a vascular and thickened state of the conjunctiva covering the cornea. That any of the authors here quoted would deny that the sclerotic conjunctiva is likewise implicated in the disease, we do not believe; and hence the error is mostly in the way of omission: but it is not on that account the less faulty; and hence, as so much, or entirely, disregarding the morbid condition of the sclerotic and palpebral conjunctiva, we consider it alike unfortunate and inaccurate.

Upon the views of Mr Middlemore and Dr M'Kenzie, as being more fully expressed, we shall dwell somewhat more at length. According to the former of these gentlemen, the disease called pannus is nothing more than an opaque and vascular condition of the anterior membrane of the cornea, almost invariably produced by the continuance of purulent or strumous ophthalmia, or by chronic inflammation of the cornea. This part becomes nebulous, covered with red vessels, and opaque. . . . . Sometimes the sclerotic conjunctiva undergoes a similar change to that which occurs in the corneal portion, but this forms no necessary part of the disease. . . . . The conjunctival covering of the cornea is first affected; in the progress of the disease the infrajacent texture is involved in a similar morbid action, so that in the worst forms of long-continued pannus, the whole, or nearly the whole of the cornea, undergoes those changes which unfit it for the transmission of light; and no therapeutic means which can be employed will have any material influence upon the general structure of the cornea, and consequently will not succeed in restoring vision.[6] To two of the opinions here delivered we feel constrained especially to object. 1st, To the doctrine "that the affection of the sclerotic conjunctiva forms no necessary part of the disease called pannus; and, 2dly, To the assertion "that in

[1] At present the term *pannus* is applied to any opaque thickening of the layer of the conjunctiva covering the cornea. Surg. Dict. 7th edit. 1838, sub voce.

[2] *Pannus*, coarse, (cloth) a thick and vascular condition of the corneal conjunctiva. Practical Work, 1840, Glossary, ii. 544.

[3] Pannus, a thickened and vascular condition of the conjunctiva covering the cornea. Manual, 1840, p. 282.

[4] On a appelé de ce nom (pannus) un réseau vasculaire formé par les vaisseaux dilatés de la conjonctive que recouvre la cornée, et accompagné d'un epaississement plus au moins considérable de cet conjonctive. Manuel d'Ophth. p. 242.

[5] And first, on the word *pannus:* this morbid condition of the conjunctival layer of the cornea, in general so rebellious to treatment. No. for July 1840, vol. x. p. 36.

[6] Treatise on the Diseases of the Eye, vol. i. 497–500.

long-continued pannus, the whole, or nearly the whole substance of the cornea undergoes morbid changes." However true these statements may be respecting the history of corneitis, or of corneitis combined with pannus, we believe they are incorrect when applied to pannus itself; and that the able writer has, in this matter, inadvertently confounded things which really differ.

Dr M'Kenzie again, herein following Beer, describes pannus as a symptom, or rather a constituent part of scrofulous corneitis; in which the conjunctival layer, and the substance immediately beneath that layer are chiefly affected, but in which all the tissues of the cornea may be implicated. Sometimes, says Dr M., the whole cornea becomes covered with blood-vessels, giving it a red colour, a symptom which is styled *pannus*.[1] With the views of this eminent oculist, so far as they refer to strumous corneitis, we do not interfere; but, so far as descriptive of pannus, we must remark, that they conjoin phenomena, or rather complaints, which are by no means invariably or necessarily associated, and interfere with the recognition of their distinct and separate existence,—exhibiting different symptoms, and calling for very different means of relief.[2]

Having thus dwelt on what we consider inaccurate definitions and views of pannus, we turn to what, in a scientific point of view, are the correct and true ones; and, for brevity sake, shall adduce, in foot notes, those of Weller, 1819,[3] and of Dr Beck in 1823,[4] and in the text shall supply a short description by Lorenz C. Rigler, the assistant of Jäger, and chief of the Opthalmic Clinic in the Josephine Academy at Vienna, drawn up as late as

[1] Under the section upon scrofulous corneitis, we read,—The conjunctival layer of the cornea, and the substance immediately beneath that layer, are the parts which chiefly appear to be affected in scrofulous corneitis; which, however, may extend to all the tissues of the cornea, and involve the other membranes. . . . The redness is principally in the sclerotica and on the surface of the cornea. . . . In some cases the whole cornea is so much covered that it assumes a red colour, and has been compared in this state to a piece of red cloth; a symptom which has, therefore, been styled *pannus;* this is generally an evident result of merely increased vascularity. The cornea is more or less opaque and rough, and its conjunctival covering thickened and changed in texture. We owe to Gierl and Ammon the observation, that opacity of the external lamina of the cornea is often a symptomatic effect of inflammation of the capsule of the aqueous humour. Pract. Treatise, pp. 447–449.

[2] This view is corroborated by Beck, who says, pannus differs essentially from corneitis, and must be distinguished from it, as it requires quite a different kind of treatment. *Loc. cit.* p. 186; foot note.

[3] Pannus is a disease consisting in the conjunctiva, the sclerotic and cornea being interwoven with smaller and larger vessels, between which grey and whitish-red dimness is observed. When the pannus is considerable, the net-work of blood-vessels appears to be so thick, that the limits between the sclerotica and cornea can hardly be distinguished, while the iris and pupil are still more indistinctly visible. Monteath's edit., i. 213.

[4] The hypertrophy of the conjunctiva (Bindehaut) of the eye-ball, not only over the sclerotica, but more especially of the reflexions of the eyelids, (Bindehaut,) wherein its parenchema becomes thickened, disintegrated, and interwoven with vessels, is named *pannus;* which again is divided into the thick and thin, denoting



1842, and yet unpublished. By this distinguished oculist, pannus is defined to be an increased and morbid action, (hypertrophy,) affecting the sclerotic and corneal conjunctiva; and it is divided into two varieties, P. *tenuis* and P. *crassus*, linked by many intermediate forms. The P. tenuis is, moreover, defined to be hypertrophy of the sclerotic and corneal conjunctiva, without disease of the submucous tissue; whilst in the crassus, carnosous, or sarcomatous, this submucous tissue is also involved. The leading symptoms of the former variety, Professor Rigler states, are the following:—"After a long continued inflammatory state of the conjunctiva, numerous delicate vessels extend from the sclerotica over the margin of the cornea, and expand themselves in the form of a grayish cloudy opacity, giving to the eye a dull and inexpressive appearance. These vessels increase in number, spread over the cornea, to a greater or less extent, usually running from the superior edge of the cornea downwards. The pupil thus becomes partially or entirely covered, and the iris concealed from view. The leading phenomena attending the second variety are an augmentation of those just enumerated. After obstinate inflammation, a thick tumefied net-work of varicose vessels is formed, either primarily in the conjunctiva, or as the sequel of the foregoing variety. In high degrees of development the metamorphosis covers the whole cornea, giving to its entire surface a brownish-red colour, and producing numerous granulations. When the disease has proceeded thus far, neither the iris nor vessels can be distinguished, and the cornea appears to be involved; and if neither nature nor art arrest it, the sclerotic conjunctiva, especially in lax leuco-phlegmatic habits, becomes covered with a growth of pale red granulations, so called, almost insensible, but easily bleeding, which are so numerous that they sometimes appear confluent, encroaching upon the cornea, until they totally cover it. Their increase separates the lids from the eye-ball, sometimes everting them. In this way a simple pannus may be mistaken for a medullary sarcoma; and the more so as the separation of the brown crusts which form on the surface, frequently occasions considerable hæmorrhage. Experience, however, proves that in this affection of the conjunctiva, the cornea often participates but little, and in the greater part of its depth remains quite transparent.[1]

In the graphic descriptions of these eminent Germans every

the more or less advanced stages of the disease. In the thick the cornea is completely obscured, and the conjunctiva so loaded with vessels, that it resembles a piece of reddish-brown cloth, and neither the iris nor pupil can be perceived; in the thin, the degeneration of the cornea is not so considerable, so that the distinction between the sclerotica and cornea, together with the iris and pupil, are visible. *Loc. cit.*, p. 186.

[1] A Treatise on the Hypertrophies of the Eye and its appendages. By L. C. Rigler, M.D., &c. &c. Translated by Dr A. B. Stout; not yet published.

one the least acquainted with English ophthalmic surgery, will at once recognise a complaint which has much engaged the attention, and excited the warmer feelings of many distinguished British oculists and surgeons. It was forced upon the attention of the profession and the public, as one of the most important sequelæ of the Egyptian ophthalmia, which produced such devastation among our troops, and frequently in civil life. It gave rise, moreover, to much keen discussion, and has not yet ceased, under the name of granular state of the eyelids and opacity of the cornea, to be regarded as one of the *opprobria medicinæ*. A few hints will suffice to bring this prevalent disease under the cognizance of the surgeon.

Though the granular eye-lids and opaque cornea certainly did not occupy a prominent place in Dr Vetch's interesting pamphlet on the *Egyptian Ophthalmia in the British Army*, of the date 1807,[1] yet, unquestionably, the combination of symptoms had, even before that period, attracted the attention of British surgeons. It was in the year 1813 that Mr, now Sir, William Adams, roused public attention, and professional discussion upon this, and other allied points; procuring Greenwich, and other public hospitals as the fields of his practice, Public Boards to investigate his claims, and the War and other Public Offices and functionaries to commingle in the strife.[2] These warm, and not very creditable, disputes, in which the distinguished medical officers of the Charter-house Eye Infirmary took a part, have well passed away, and hence we shall not farther dwell upon their history. It is quite true, that throughout these discussions the name of pannus was not once introduced; but the disease itself had, notwithstanding, a most prominent place; and its great practical importance will hence at once be perceived. The truth appears to be, that many of the medical men, whose attention was directed to the subject of eye diseases, had, as we have seen, very erroneous and confused ideas of the true nature of pannus, and, occupied with the important complaint itself, thought little of the name by which it should be distinguished: and later authors on ophthalmology, perplexed with the contradictory definitions and accounts of pannus, seem to have judged it wisest to exclude the term altogether from their nosology. This seems evidently to

[1] An account of the Ophthalmia which appeared in England since the return of the British army from Egypt. 1807.

[2] See "official papers relating to the operations performed by order of the directors of the Royal Hospital at Greenwich, on several of the pensioners, for the purpose of ascertaining the efficacy of the new modes of treatment of Mr Adams for cataract and the Egyptian ophthalmia." Published by order of the directors. London, 1814.
Dr Vetch's Observations on Sir William Adam's treatment of the ophthalmic cases of the army. London, 1816.
Sir William Adam's Reply to Dr Vetch's pamphlet, and to other similar productions. London, 1816.



have been the case with Mr[1] Tyrrell, who does not introduce the term pannus into his index, nor, so far as we have observed, into the body of his work; although in that section of his book which treats "of chronic inflammation of the conjunctiva, following purulent and catarrhal ophthalmia," we are furnished with a very exact and excellent account of it.[2] Mr Tyrrell here probably cut a knot which it was not very easy to untie; and of all the British ophthalmic authors with whom we are acquainted, Mr Lawrence is the only one who has indicated, though briefly, the true state of matters at once scientifically and practically. We gladly, therefore, copy a few sentences from his *Treatise*. In that chapter which treats of "purulent ophthalmia in the adult," and in that section which discusses the treatment of the diseased palpebral conjunctiva in the chronic state, he states:—"when purulent ophthalmia has been neglected, or insufficiently treated, and when the eye has consequently been repeatedly inflamed, the palpebral linings became thoroughly altered in structure, and we cannot be surprised that it should be difficult, and, indeed, hardly possible to restore their healthy state. This condition of the parts has been called by English writers, the granulated state of the eye-lids, . . . a very important effect of which is vascularity and opacity of the cornea. The mechanical friction of the granulations, on the surface of the cornea, causes its vessels to be enlarged, so that the texture of its conjunctival layer is loosened and thickened; hence haziness, a nebulous state, or more considerable opacity is produced. The following is the order of the events. First, disease of the palpebral lining; 2*dly*, acute inflammation of the conjunctiva; 3*dly*, full development of the granular surface, then thickening and hardening of the membrane; 4*thly*, vascularity and opacity of the cornea; the morbid change is frequently confined to the upper half of the cornea, that is to the portion over which the rough surface of the upper eye-lid moves; whilst the lower half remains transparent; but the vascularity may proceed to the extent of covering the cornea with a net work of red vessels; and its mucous covering may be so loosened and thickened, as to exhibit the state technically called *pannus*, in which the boundary of the cornea can hardly be seen."[3]

It thus clearly appears that the term Pannus, so generally abandoned and misunderstood by British authors, is an appropriate and approved appellation for that most troublesome and well-known disease, which we are in the habit of designating by the periphrase—vascularity and opacity of the sclerotic and corneal conjunctiva, from a granular state of the lining membrane of the eye-lids;—the granulations here spoken of being nothing

[1] Alas! we must correct—*the late* Mr Tyrrell.

[2] Vol. i. pp. 118–138.

[3] Treatise, &c., pp. 264, 265.

more than a morbid enlargement of the natural villi. Correct nomenclature, and the use of terms, we hold to be of importance; and for this among other reasons, that without them we cannot readily apprehend the laborious investigations of accurate observers, whether in our own country, or in other lands.

And now, it being clearly established, that the chronic granular conjunctiva is one, and a very common cause of inveterate pannus, we should here inquire if there be any others. Great obscurity, we fear, prevails here, and additional elucidation is required. A single fact is all we can supply. Mr Ware, many years ago, detailed three cases, and stated that he had seen others, in which there appears to have been genuine pannus unpreceded, certainly, by Egyptian ophthalmia, or any blenorrhagic affection whatever of the eye; and in which, with the case under his immediate observation, this able oculist could discover neither inflammation nor of any its consequences. Sometimes the one eye became affected while the other eye was under treatment. Obscurity gradually crept over the cornea, now from one part of the circumference, now from another, obstinately progressing till vision was nearly gone. Mr W. discovered that the obscuration was confined to the conjunctival covering of the cornea, and that the neighbouring parts of the sclerotic portion were similarly affected.

All the common remedial means failing in his hands, he was forced to have recourse to the removal of a circular portion of the sclerotic conjunctiva by a surgical operation. The cases themselves are well worthy of study: but all that we can do in this place, is to give beneath a short epitome,[1] which will corroborate our statement, and will enable the reader to form his own judgment.

[1] The cases referred to are the 14th, 15th, and 16th. Mr Ware entitles the first opacity of the cornea, with a very slight degree of ophthalmy; the second, Universal opacity of the corneas of both eyes without previous ophthalmy; and the third, Universal opacity accompanied with only a small degree of ophthalmy. The subject of the first case was a girl aged 15, who had lately suffered from low fever. The disease attacked first the left eye. On the first examination, a slight opacity was found extending over the whole cornea, with the appearance of minute drops of water transuding through the pores of the tunic. After three weeks' treatment with leeches, bark, and astringent washes, during which time she was free from pain and irritability, the opacity not only remained, but became so considerable that, with this eye, the patient could not distinguish one finger from another. It now occurred to Mr Ware, that the opacity did not extend throughout the whole thickness of the cornea, but was an affection of the corneal layer alone, connected with a morbid state of the blood-vessels of the conjunctiva, these being enlarged upon that side where the opacity was greatest, and some of them advancing in the cornea beyond the junction of the two tunics. This complaint was cured by the excision of a circular portion of the sclerotic conjunctiva, not far from the margin of the cornea. But while the cure was advancing, the sight of the right eye, which till now had been strong and clear, became dim, without any marks of inflammation in the conjunctiva, and in a few days a slight cloud began to show itself in the inferior part of the cornea. Leeching and other remedies were employed without benefit; on the contrary, the blood-vessels surrounding the cornea became enlarged; the opacity increased rapidly, and the obscuration of vision was great. In Mr Ware's remarks on this case, we read, "the principal circumstance which here claims notice, is the cornea becoming universally opaque, without any considerable inflammation, either preceding or accompanying this change of structure. The cornea is composed of laminæ, covered by a transparent membrane continued from the tunica conjunctiva. In a diseased state this membrane often becomes visible by means of the blood-vessels that are continued from the one part of the tunic to the other, and this membrane is the part which, in the cornea, becomes universally opaque." He adds, "As I do not recollect to have seen any case similar to the preceding, described by authors on this subject, and as several of the same kind had fallen under my observation, I shall give two more, concerning which, I wish it to be remembered, that they were unaccompanied with any active inflammation." Remarks on the Ophthalmy, &c. 5th edit. 1814. Pp. 175–183.



That the disease is to be distinguished from *xeroma conjunctivæ*, not unfrequently styled *dry pannus*, is sufficiently understood.

Having said thus much of the true nature and causes of pannus, we now proceed to the consideration of its usual treatment, which, as is well known, has long been regarded as most unpromising, and often almost hopeless.

The keen controversy which, twenty-five years ago, was excited by Sir W. Adams, on this special point, and other allied ones, will not soon be forgotten. How far his proposal had the merit of originality, was borrowed from Dr Vetch, or learned from Mr Saunders, we will not stop to inquire; but now, that the heat of the contest is past, one thing seems clear, that none of the plans then urged—the removal of the palpebral conjunctiva, whether by the knife, by the scissors, or by cautery,—had any considerable influence over the great majority of the cases, or prevented them from advancing to that stage in which they were no longer efficacious, but left the unfortunate victim the subject of much suffering, and often of complete blindness.

The language of Mr Lawrence, (at the time one of the officers of the London Ophthalmic Infirmary,) in 1840, is sufficiently distinct on this point. "When the eye has been repeatedly inflamed, and the palpebral lining become thoroughly altered in structure, we cannot be surprised that it should be difficult, and indeed hardly possible, to restore their healthy state.[1] That of his colleague, Mr Tyrrell, is not less so. "When I first became surgeon to the Ophthalmic Hospital, I tried the plan recommended by Mr Saunders, with the utmost care and perseverance; and although the relief was in many instances considerable, yet it was rarely durable. The symptoms were usually mitigated, and then became gradually augmented. Thus have I seen patients go on under this treatment for weeks and months together, sometimes improving, sometimes relapsing; and altogether making a most unsatisfactory progress, until they became completely tired and ceased to attend." This judicious practitioner mentions one case in which he had removed the granular surface not less than fifty times, and without permanent relief.[2]

[1] Treatise, 1840, p. 264.

[2] Pract. Work, i. 131, 133.

This failure of these vaunted means led Mr Tyrrell to adopt a method based on different principles, and which consists in occasional very moderate local depletion, by means of one or more leeches, or by scarification of the palpebral lining of the eyelid, combined, and often alternated, with the use of mild astringents, of which the solution of the diacetate of lead, and the sulphate of copper, according to circumstances, have proved the most efficacious; at the same time attending to, and if possible improving, the general health. The author speaks in strong terms of the efficacy of this simple method of treatment; and in mild cases, early subjected to its skilful employment, we doubt not its power. In severe cases, however, and in unfavourable circumstances, the issue, we apprehend, will be very different; a conclusion which appears to be hinted at by Mr Tyrrell, when he says, "under great neglect and maltreatment of this chronic disease, the cornea, or its conjunctival covering may become permanently opaque, in consequence of organization of the morbid deposit to which the disease gives rise."[1]

We must also state that a difference exists in Dr Weller's tone in his first edition, 1819, and in his third, 1826, which, at first sight, leads to the supposition, that later experience had furnished him with more powerful instruments for controlling this disease. In the former, he states, that if the pannus be old and habitual, the cornea often remains somewhat dim, even after the best possible treatment;[2] whilst in the latter he speaks of a method "he uses with invariable success."[3] Upon examination, this method is found to consist of what he calls a strong dose of mercury, viz. three grains of calomel with jalap, and then gently affecting the constitution with this metal, and giving diaphoretics; together with local treatment, consisting of counter-irritation behind the ear, or on the occiput, along with the use of astringents and stimulants to the organ. The efficiency of this treatment cannot, we conceive, be estimated very highly by those acquainted with the nature of this disorder; and Weller's invariable success must be clearly taken *cum grano;* the more so as he allows that, before you can anticipate success, every cachectic state of the constitution must be removed, and every thing like strumous, catarrhal, rheumatic, and other dyscrasia, must first be overcome.[4]

[1] Loc. cit. i. 133. [2] L. c. by Monteath, i. 214.

[3] Die Krankheiten des Menschlichen Auges, &c., p. 184. Berlin, 1826.

[4] In some cases, the cutting out a portion of the conjunctiva, from a line to a line and a half in breadth, all round the edge of the cornea, seems, with other means, to be attended with the happiest success. This plan, therefore, should be tried before proceeding to more violent remedies. It especially promises to succeed in the case without apparent inflammation, first described by Mr Ware, (see ante. p. 586,) who had the merit of introducing the practice, and with great success.



Having said this much of the principles and appliances of the art now in vogue for the removal of pannus, we are prepared to estimate aright the value of the proposal of cure by the inoculation of the matter of blenorrhœa. If we have an opportunity of treating from the commencement, or in its earliest stages, either the violent purulent ophthalmia, or the milder muco-purulent one, and in the former instance, have seen the organ safely brought through the imminent peril of rupture and disorganization, and in both, have an opportunity of treating early the slower and insidious process usually styled that of granulation producing opacity of the cornea, in other words, pannus,—then our hopes of a successful issue may be high and satisfactory; but, on the contrary, if these disorders have proceeded unchecked, and the pannus has made considerable progress, and become at all permanent, then we fear that all the common resources of the art will be found alike futile and unavailing. This, from the very nature of the circumstances, is the character of those cases in which such oculists as Jäger and Piringer resort to the practice now to be considered; and such is the only class of cases in which the method is here recommended for adoption.

That Egyptian ophthalmia, in its most violent as well as milder forms, and Gonorrhœal ophthalmia, from the direct introduction of urethral matter, and the Ophthalmia Neonatorum, should all be regarded as only varieties of one and the same disease, produced by one and the same morbid poison, and yet that this disease, so rapid in its course, and destructive in its consequences, should wittingly and of express purpose be proposed and employed as a remedy for the removal of another, not only implies that this latter should be most serious, and otherwise all but irremediable, but exhibits likewise in its successful issue one of the most striking instances of human ingenuity, and one of the greatest triumphs of the art.

That this issue has been reached, is too clear to admit of doubt, and now rests upon evidence too ample and stable to be overturned. In the year 1830, Dr Piringer reported fourteen successful cases of cure by this method, accomplished in the hospitals of Vienna and Gratz.[1] In his work, again, upon blenorrhœa, published in 1841, his experience had extended to sixty-one cases, while that of Professor Jäger last year, (1842,) had reached to the extent of eighty-four cases, so forming a total of 145. Of these, seven cases only, from causes which will be subsequently mentioned, were more or less unsuccessful, leaving a very large surplus in favour of the operation. Nor were the symptoms of the superinduced process whereby the cure was effected, at all so severe as might have been anticipated, so that the practi-

[1] Med. Jahrbuch. des k. k. Oesterich. esclin Staates, vol. xv. part 2.

tioner may proceed with confidence, while the patient willingly submits not to one trial only, but occasionally to several, till perseverance is crowned with complete success.

*Indications.*—Nearly all that is necessary on the subject of the indications which ought to regulate our practice in this method, has already, we believe, been premised. It is alike applicable to all varieties of complete pannus, whether they be membranous, vascular, or fleshy, whether they be thick or thin, and either free from, or accompanied with inflammation of the conjunctiva, or with serous discharge, or even with granulations. In the great majority of cases, the affection pervades both eyes; and it must ever carefully be seen to, that the pannus is complete,—that is to say, covering the whole cornea, and not partial only, because the remedial process affects very differently the diseased and the healthy cornea, risking and injuring the latter as much as it benefits the former.

*Contra-indications.*—The contra-indications, if we would look for anything like uniform and complete success, must be thoroughly understood and carefully observed. The incompleteness of the pannus, as just stated, is one. We must also discriminate, as before hinted, between this disease and conjunctival xeroma,—the cuticular conjunctiva of Travers,—the xerophthalmus of Beer, a disease in which the conjunctiva is always drier than usual, and appears as if skinned over, and in which the secretory structure of the parts appears altered, and its powers of forming mucus either partially or entirely lost; here the treatment by inoculation has no remedial powers. But by far the most important contra-indication is the existence of any dyscrasia, or bad habit of body, especially struma, also gout, rheumatism, syphilis, and such like. We are about voluntarily to subject the frame, and especially the delicate organ of the eye to a disorder which will prove more or less urgent and severe, and if the general health be not tolerably good, and the vital power considerable, then we have no right to expect aught else than destruction of the organ we wish to restore. The general health, therefore, should never be below par. Neither is this process a remedy for opacities of the cornea, including leucoma, over which diseases it has no power; and if they are complicated with pannus, while this latter is cured, the others remain. This remark naturally extends to various other abnormal complications, which continue as they were; whilst it is no doubt true, that some of them are placed by the process under much more favourable circumstances. Thus is it with cases complicated with cataract, and with closure, or adhesion, of the iris, which previously could not be detected, but which after this treatment may be removed with as much prospect of success as if no pannus had preceded. One other point must be attended to, namely, that when the functions of the sensitive parts of the eye have been for a time suspended, then it is to be expected that they will gradually be weakened, and finally extinguished. The time required for the complete destruction of the nervous sensibility varies, and does not appear to be satisfactorily ascertained. It probably ranges from between two or three to four or six years; and if the obstructing cause has continued until nearly the latter of these periods, it ought to be explained to patients, that such cases are not so favourable, as if they had sooner applied. At the same time, it is a fact, that often, under the renewed stimulus of light, those powers and parts which had so long remained dormant, are sometimes wonderfully excited again to their normal condition.



A judicious selection of cases for treatment being first of all made, due attention must next be paid to the manner in which the inoculation is conducted. A careful investigation of this point has been made by Dr Piringer and others, based upon numerous observations and experiments; but of these we cannot here introduce even a summary, and shall confine ourselves to those points only which are absolutely required to make the method intelligible and distinct.

Dr Piringer distinctly holds, that Gonorrhœal Ophthalmia from the matter of urethral discharge, the Egyptian ophthalmia under all its forms, and the Ophthalmia neonatorum, are nothing more than modifications of one and the same disease. With respect to the last of these disorders, he likewise regards it a matter of indifference whether it is induced by the discharge of simple leucorrhœa, or by that of a virulent clap. He holds, moreover, that the same disease is often produced without the presence of any morbid poison whatever, and is witnessed in pure catarrhal ophthalmia, *Conjunctivitis catarrhalis*, produced from exposure to cold or blight, and that in adverse circumstances, as from hospital miasma, it will assume the unfavourable characters of the other varieties, and will induce them by the application of its muco-purulent matter. These views we have no occasion, at the present time, to canvass; and proceed to state that it follows as a corollary, that the matter from any one form of these numerous complaints, is capable, when rightly applied, to superinduce that disease or process, which is desiderated for the cure of pannus. Admitting, for a moment, that there might be some ground to demur to the former of these views, yet it would appear from the evidence, that there is no room for hesitation as it respects the latter; and we must regard it as a fact, that the matter secreted in one and all of these complaints is capable of producing a purulent ophthalmia, which is adequate to the removal of pannus. Piringer, Jüngken, and others, most unhesitatingly declare this to be the fact, and have proved their assertion by so many and

such carefully conducted experiments, that no ground is left for denying it.

As to this purulent ophthalmia—Blenorrhœa.—Dr Piringer divides the cases, however varied the forms in which they present themselves, into three degrees or classes, distinguished as the first, second, and third; the first being the mildest: which degrees, correspond to what may be called, *mild* cases, *serious*, and *violent* cases of the disorder.

The purulent discharge in these several forms varies, as every one knows, not only in quantity, but differs also in quality, being sometimes healthy pus, and at others, a thin glairy fluid. According to our experimenters, these variations in the quality of the virus, while they modify its powers, do not interfere with its specific and peculiar properties; so that the matter proves certainly contagious, whether it be yellow, thick, and purulent, or a milky mucous secretion, or thin, and resembling the white of eggs. These various kinds of matter, however, possess their specific powers in different degrees; the riper and richer the discharge, the greater its contagious property, and the speedier the rapidity of its operation. Again, as it respects all of them, the virus is strongest when it is fresh, and is weakened by dilution in water, by exposure to the air, and by age. Dr Piringer's statement is, that the blenorrhœal secretion certainly retains its contagious property only when introduced fresh and fluid; that its powers diminish and begin to expire in from thirty-six to forty-eight hours; and that in three days it is inert. In the author's words, "no longer possesses organic life."

Regarding the development of the inoculated blenorrhœa, Dr Piringer has learned from his experiments, that it varies according to the kind and quantity of the matter used, also according to the temperament of the patient, and the time of the inoculation. Under like circumstances, the fresh matter of blenorrhœa of the third, or most severe form, will take effect in from six to twelve hours; that of the second degree, in from twelve to twenty-four, or at farthest, in thirty-six hours. Again, the fresh whey-like secretion of a blenorrhœa of the third degree operates in between sixty and seventy hours, whilst the fresh mucous secretion of a chronic case will require from seventy-two to ninety-six. The greater, also, the quantity of the matter employed, the sooner the effects of the inoculation manifest themselves. When two eyes were simultaneously inoculated, the one receiving the greater quantity of matter became affected several hours sooner than the other; but when equal quantities were carefully introduced the two eyes became inflamed at the same time. Sanguine and irritable temperaments are most susceptible, and more speedily affected by the inoculation than others. And, as to the



time of attack, it is curious, that in full day-light the blenorrhœa seldom commences; after sunset, and the earlier part of the night, are the usual periods of attack, being fully developed before the morning. For successful inoculation, the virus must be laid not only upon the eyelids, but within them, being directly applied, with a hair pencil, upon the conjunctiva, and within the tarsal margins.

These statements seem sufficient to enable any one readily to apprehend the principles which ought to direct us in the actual employment of the remedy. All are aware how severe and fatal the disease frequently proves when it attacks the previously sound eye, and may hence infer, that it is no trifling complaint in the diseased one. The symptoms may run high, and may sometimes require active treatment; but the amount even of the superinduced disease may, by a little experience and forethought, be estimated, and all overaction prevented. The virus should be selected from a case of mild blenorrhœa; which will readily be found in an example of Ophthalmia neonatorum, a mild case being preferred. Should a case of this description not be within reach, then, by diluting the discharge of a more acute disease with water, or by exposing it for a longer or shorter time to the air, its virulence will be lessened; while, by regulating the quantity introduced into the eye, the result will still further be modified. It is evident that we should at first proceed with caution, and err rather by underdoing than by overdoing. If we fail once, no harm is done; and the virus may be applied stronger and more largely on another occasion. The more speedily the inoculation begins to take effect, the more violent are the symptoms likely to prove; and the more decided should be the remedies, if it becomes necessary to use any. Even when thus cautiously produced, the disorder must be carefully watched, and judiciously regulated. A thick firm fleshy pannus requires, for its dispersion, a higher degree of the sanative inflammatory action than a thin and less organized one. If then the disease prove mild and favourable, we should not interfere. If, on the other hand, the action threatens to be excessive, endangering the eye-ball, local depletion, and if necessary, general, together with the usual constitutional remedies, and the local, especially cold or iced water, must be had recourse to. That the remedy is a severe one is undoubtedly true; but there are few who have the misfortune of labouring under the complaint, who are not found willingly to submit to it. We need scarcely add, that the disease excited in the eye affected with pannus, runs its course much less violently, than when it attacks the healthy eye. It frequently leaves the cornea perfectly clear and transparent in the course of ten or fourteen days, although it often requires a longer period, extending on an average, according to Jäger, to about six weeks. And it is most satisfac-

tory to know, that so far as the past experience of the method has proceeded, no case has occurred in which the morbid action has extended to the deeper seated parts of the organ; nor has it ever produced those disastrous effects which are so often witnessed after attacks of the healthy eye, such as suppuration, bursting, and evacuations of the humours. In fifty-nine of Dr Piringer's sixty-one cases, not one was injured in the slightest degree.

As exhibiting the operation of the remedy, we shall here give an epitome of a few of Dr Piringer's cases.

1. A man, aged 53, had thick fleshy pannus of both eyes, of two years standing, so that he could not at all perceive the light. In the year 1825, he was treated in the Vienna Hospital for the Egyptian ophthalmia; pannus notwithstanding followed, and in 1827 he was totally blind. In the year 1829, he was inoculated with the matter of a gonorrhœal ophthalmia, from a patient who had accidentally introduced the matter from the urethra into his own eyes. In forty-eight hours a very severe inflammation was fully established. As the patient had a cachectic habit, cold applications only were applied to the eyes. In two weeks he was able to discern objects; but eighteen weeks elapsed before he was dismissed in good health, and with perfect vision.

2. This second case exhibited an old pannus of two years continuance, along with considerable inflammation, lacrymation, and mucous discharge. For six months the whole armoury of pharmaceutical means was employed, with only slight and temporary improvement, so that they were given up in despair. Inoculation with the fresh matter of a simple blenorrhœa was now had recourse to, and in twenty hours acute blenorrhœa was developed. After eleven weeks the cure was so perfect, that the eyes appeared as if they had never been diseased. After the lapse of eight years, they remained in the same satisfactory condition.

3. The next case we notice is that of a student aged 18, who had one eye affected with pannus, the right, the other being quite healthy. The pannus was thick, with a central opacity, surrounded with a lymph-like exudation. The more usual treatment was employed for five weeks with all solicitude, but without any benefit. Inoculation with the matter of simple blenorrhœa was then had recourse to; and in eight weeks, after a mild inflammation, the disease was entirely removed. The central corneal opacity still remained, impeding vision; and this defect was removed by a slight artificial enlargement of the pupil. The left eye, being carefully protected from accidental inoculation, entirely escaped.

4. Dr Piringer also reports a case in which the inoculation was repeated no less than five times. The patient was a man, aged 47, who had for several years been afflicted with obstinate



ophthalmia, the sequela of the true Egyptian, together with thick fleshy pannus. The first inoculation failed, producing no apparent effect. The second excited only slight and temporary irritation. The third operated efficiently, was fully effectual, cured the chronic blenorrhœa, and reduced the pannus to the consistence of a thin membrane. The fourth diminished the pannus still more, so that light became visible, and the iris apparent: whilst the fifth inoculation removed all external disease. We adduce this case, not so much from the attending success, which though slow, was sure, as for the purpose of demonstrating that the process of cure is not so insufferable as might at first be supposed; and that patients will readily submit to it, in the anticipation of having their sight restored.

Of the seven unsuccessful cases, occurring out of the 145 reported by Professor Jäger and Dr Piringer, four failed, not because they did not clear the cornea, but from the coexistence of amaurosis, which, from the veiled state of the cornea, could not be previously discovered: the want of success in the other three arose from a vitiated state of the constitution, whereby diseased action was induced in the eye, and no benefit accrued.

An unexpected and very striking illustration of that curious and obscure subject, known as the sympathy existing between the two eyes, more especially in their morbid condition, has presented itself during the history of this method of treatment, and must not here be omitted. That the diseased state occurring in pannus materially alters the organic character of the conjunctiva, and the parts immediately connected with it, and also the susceptibility of these parts to disease, cannot be doubted. Accordingly it was remarked, that if the inoculation was confined to the diseased eye, pannus existing also in the other, in a few days after the commencement of reaction in the former, the latter also took on the same action, and both the panni were alike cured. But when one eye only was affected, it was long feared that the destruction of the healthy eye would be the consequence of the inoculation of the diseased one; and the progress of improvement for a time was on this account retarded. Professor Jäger, however, on mature reflection, came to the conclusion, that this inference by no means necessarily followed. He boldly, therefore, inoculated the diseased eye, inducing the process which restored it to its normal state, and found that the healthy eye remained unscathed throughout the treatment. And now the rule is this, that when both eyes are affected, the inoculation of the one suffices for the cure of both; whilst when one only is diseased, there exists no sufficient reason for declining its cure: all that is required being, that the measure of care necessary when only one eye is attacked with gonorrhœal ophthalmia, shall scrupulously be observed in this case

also. By due care it does not spread in the former instance, and no more does it in the latter. Cases not unfrequently present themselves in which one eye only is affected, the other being healthy; and the patient is annoyed, not so much with the loss of sight, as with the unseemly deformity under which he labours: and such is the uniformity of success, that a case of this kind may be fearlessly undertaken, with every prospect of the most favourable result.

Should an attack in the healthy eye unfortunately supervene, it is to be treated with the utmost promptitude and care; and, upon the principles lately so ably inculcated for the treatment of violent purulent ophthalmia, by Mr Tyrrell, we hope the success will be greater than has hitherto been noted in the annals of surgery.

In a recent number of Dr Forbes's *British and Foreign Medical Review*, the able author of an excellent paper on the eye and its diseases, thus notices the subject of pannus:—"This morbid condition of the conjunctival layer of the cornea, in general so rebellious to treatment, Professor Jaeger tells us he has sometimes succeeded in removing, by exciting in the eye a new attack of blenorrhœal ophthalmia, by means of inoculation, and then by well-directed treatment bringing this inflammation to a favourable termination. This, it is obvious, continues the reviewer, is a hit or a miss proceeding, even if he could always calculate on the cornea becoming clear, in the cases in which he might succeed in saving the eye from total destruction."[1] To this smart, not to say severe criticism, the foregoing remarks furnish, we trust, a satisfactory answer. One hundred and thirty-eight complete cures, out of a hundred and forty-five cases, "in general so rebellious to treatment," cannot now surely be characterized as a "hit or a miss proceeding;" and the nature of the disease, and the rationale of the treatment, so succinctly, and consequently, we fear, so imperfectly described in the foregoing pages, is yet, we hope, sufficient to vindicate the wisdom of the proposal, and to exhibit it as a signal triumph of the art.

One word, in conclusion, concerning the individual to whom the merit of originating the proposal is due. Professor Jäger informs us that he made the discovery as early as the year 1812, and practised it with success in the Vienna General Hospital, while yet assistant to Professor Beer, publicly recording the success of his experiment in the *Tübingen Blätter* of the time, published by Ludwig. This reference we have not been able to examine. Certain, however, it is, that the plan for many years was neglected, and even by Professor Jäger himself. Dr Piringer then gave it a trial, reporting, as already stated, upon a few

[1] No. xix., July 1849, vol. x. p. 36.



cases, in 1830, and on more in 1841; Jäger prosecuted the plan even to a greater extent; and little more, we suspect, is to be found concerning it in the repositories of Science.

One notice, however, we must supply,[1] as afforded in the year 1810, by Dr Walker, assistant-surgeon, second battalion 71st regiment, then stationed at Glasgow, and suffering severely from the ophthalmia at that time so prevalent in the British army, and which went under the name of the Egyptian ophthalmia. The disease, according to Dr Walker's observation, attacked under two distinct forms; the one agreeing with the common description, and treated by the severe depletion which was carried so far by English surgeons. It is with the other variety, however, we have now to do. "The second variety," says the Doctor, "commences on the whole surface of the convex conjunctiva: in it, according to his experience, depletion did more harm than good, and scarification was the preferable remedy, though it often failed; for in defiance," he adds, "of every remedy, a slow and insidious vascularity of the cornea takes place, which in no long time destroys vision." But it is to the following sentence we particularly invite attention. "Disappointed," says Dr. W., "by every method hitherto recommended, I endeavoured to make the eye affected with this latter variety assume the inflamed action of what has been called purulent ophthalmia; and to this I applied the usual remedy, venesection. In several cases, the practice has proved successful, not a single large vessel remaining at the end of a fortnight. How far it may answer the purpose intended, I have not yet had sufficient evidence to enable me to decide. Daily reports of the practice and its effects, may enable me at a future period to lay it before army surgeons."[2]

Here then is most satisfactory evidence that a slow and insidious vascularity of the corneal conjunctiva, in a short time destroying vision, was in several cases successfully treated by Dr Walker at Glasgow in the year 1810, by causing the eye to assume the inflammatory action of what is called purulent ophthalmia—a treatment which was published to the world in January 1811, in the best known Journal of the time. Whether Professor Jäger received the hint directly or indirectly from this source, or originated the plan anew, is of no great moment. We wish neither to detract nor to contravert. But, at the same time, we feel assured we shall stand excused for reclaiming in behalf of Dr Walker, of whose history, as well as that of his method, we know nothing further, whatever merit may be due for the proposal and adoption of a plan, which in principle of treatment approximates, if it be not identical, with the one to which we have been soliciting attention.

[1] Kindly indicated by Mr T. Wharton Jones.
[2] Edin. Med. and Surg. Journal, January 1811, vol. vii. pp. 1–5.

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# NOTICE OF SOME RECENT SUGGESTIONS FOR THE IMPROVEMENT OF OPHTHALMIC PRACTICE;

AND, FIRST,

# UPON THE MINUTE CARE TO BE OBSERVED IN PERFORMING THE PRINCIPAL OPERATIONS ON THE EYE,

AND THE

# TIMES AND SEASONS AT WHICH THEY MAY MOST SAFELY BE UNDERTAKEN.

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(*Read before the Medico-Chirurgical Society of Edinburgh, Feb.* 1843.)

In requesting the attention of the members of this Society to certain suggestions which have lately been made by others for the improvement of ophthalmic practice, I would venture, preliminarily, to submit one which recent circumstances have strongly forced upon my own attention, and which may be expressed in these terms, *That it would be well if the members of the profession in this country generally, in their estimate of the importance of the grand operations upon the eye, would bring their ideas somewhat more into unison with the very high one entertained by their brethren in Germany*, who are so assiduously and successfully cultivating this field of practice. That there is a marked difference in the estimate taken by the professional men of these two countries is, we believe, so familiarly known, that it is unnecessary to enter into any general or formal proof of the proposition. Such a proof might be made, with propriety, to rest upon the vastly superior degree of attention which is paid to the cultivation of the science of ophthalmology in the one country more than in the other, exhibited in the public arrangements made for teaching it, consisting of various professorships in the same school, for systematic lectures, and for practical or clinical courses upon the diseases of the eye; in the consequent necessary existence of wards or hospitals for exclusive attention to the diseases of the organ; in the long and protracted courses on these subjects which are prescribed to the students; and in the assiduous attention of the numerous pupils, both native and foreign, who avail themselves of these rare opportunities; also in their anxiety to procure courses of operative ophthalmic surgery, at the hands of the many illustrious practitioners of the art, and in their obtaining distinct diplomas and doctor's degrees

in ophthalmology from those who are officially appointed to confer them; and, finally, as the result of all this, in the great number of eminent and skilful oculists, who are every where spread over Germany, practising with the highest degree of celebrity and success. On any general proof of this sort, however, as already stated, we will not now dwell; and the more so, as we have endeavoured, in a paper to appear in the next Number of the *Edinburgh Med. and Surg. Journal*, somewhat fully to establish and demonstrate it. On the present occasion, therefore, we address ourselves chiefly to one point, viz., To the degree of attention which should be paid to the particular times and seasons at which the principal operations upon the eye should be undertaken,—a subject which merits consideration on its own account, and which, moreover, appears peculiarly calculated to illustrate the general proposition we are anxious to establish.

That this is a question to which but little general attention is at present directed in this country, will, we apprehend, be at once conceded; and from this it follows as a consequence, that in practice it is but rarely attended to. If a case of cataract, for example, which requires, and is otherwise suitable for operation presents itself, the surgeon, in delivering his opinion to the patient or his friend, seldom makes the season of the year, or the prevailing character of the weather at the time, an element in influencing that opinion, or in regulating the directions which he proceeds to give. He regards these seasons, whether spring or autumn, summer or winter, very much upon an equality; and other circumstances favouring, proceeds at once; either ignorant that any adverse agencies are likely to operate, or as if he had advisedly come to the conclusion that none such exist, or have power to harm.

It is true, that there is a section, though only a small one, we believe, of able oculists, who take a very different view of this matter; and to their opinions we shall presently have occasion to revert. In the mean while, we shall endeavour to make good our statement of the neglect with which this consideration as to times and seasons is treated,—1*st*, By a frank and general appeal to the sentiments and practice of medical men throughout the country; and, 2*d*, By a reference to the published opinions of some of the most popular authors who have written upon the diseases of the eye. Connected with the former of these points, we can at least answer for ourselves, that when, not many months ago, the opinion was announced, that it was injudicious and prejudicial to perform any of the great operations upon the eye during bad weather, and in the winter months, it came upon us with all the force of novelty. And as to the latter, we shall subjoin the sentiments of Messrs Laurence, M'Kenzie, and Middlemore, fair representatives, we presume, of the well-instructed



oculists of the best class. As to the matter of fact, Mr Laurence gives his testimony in these laconic, but explicit terms:—"The operation for the extraction of cataract has usually been performed at all times of the year indifferently," (*Treatise on the Diseases of the Eye*, p. 618;) and it is superfluous to add, that if this be true with regard to the operation of extraction, it is not less so of all the other operations on the organ, considered, upon the whole, less difficult and hazardous. In perfect accordance with this statement of Mr Laurence, Dr M'Kenzie writes,—"A purely local cataract, occurring in an individual otherwise healthy, may be removed at any season," (*Practical Treatise*, p. 664.) In answer to the question, Is there any particular season of the year more suited than another for operation? Dr M'Kenzie replies, "The spring was formerly selected in preference to any other season; yet from the prevalence of catarrhal, rheumatic, and inflammatory affections at that period of the year, it is perhaps the worst." He, however, adds, "Patients who are liable to suffer from such complaints, ought to be operated upon in dry summer weather only." And, once more, Mr Middlemore,—"I do not find that it is of much importance at what season of the year we operate for the cure of cataract, provided the subject of the operation be in a good state of health." (*Treatise*, ii. 124.) These extracts, then, from our highest English authorities, speak a very unequivocal language on the point, and declare, that the prevailing practice in Britain has been to perform the principal operations upon the eye at all times of the year indifferently.

In proceeding to exhibit the opposing opinions and practice on this point, it may be worth while to present the evidence *seriatim*; and we shall begin with the most recent,—that adduced within a couple of years, and with all the characters of a novel suggestion, by Mr Tyrrell. His excellent "practical work" was published in the year 1840; and the only remark we there meet with on the matter, is the following very weighty one:—"I am perfectly satisfied, that the operation of cataract is most hazardous during the cold and damp seasons; so much so, that it is only under very particular circumstances that I ever operate in the period from October to March. The proportion of unsuccessful cases has been very much lessened since I have discontinued to operate in the cold and damp periods of the year." (ii. 419.) Mr Laurence, in his second edition, published also in 1840, apparently speaks of this proposal as originating with Mr Tyrrell. His statement is,—"Some operators have confined themselves to particular seasons. Mr Tyrrell expresses himself strongly on the point, declaring that he is satisfied," * * * as in the words just quoted. To this we may add, that in our recent intercourse in London, with some other eminent ophthalmic surgeons, we found, that their experience of the injurious

effects of operating at all seasons of the year perfectly corresponded with that of Mr Tyrrell, and that they cordially united with him in condemning all serious operations which could be avoided during the winter months.

But although this suggestion of Mr Tyrrell and those other gentlemen may, with them, have all the merit of originality, yet a little farther investigation will show, that it is nothing more than the revival of an old practice as it respects England, and the introduction into this country of a precaution which has been very uniformly followed upon the Continent. We take leave to make this observation, not for the purpose of detracting from any merit to which Mr Tyrrell and his associates may, on this account, be entitled; for we quite concur with the old French proverb, that "no discovery is more important than the recovery of a lost one;" and this probably expresses the true position of the one now under review. But, on the other hand, it seems important, that the experience of these British surgeons of our own day should be fortified by the uniform practice of the great authorities of the German school, than which it is impossible to adduce any more worthy of attentive consideration. And here, instead of ransacking their ponderous treatises, whether more ancient or modern, we shall take the liberty of reporting some of the information we received at the different schools, in answer to the inquiries we made upon this point; and which, we believe, will afford a fair sample of the actual practice in these several localities, and throughout Germany.

One of the first individuals with whom we conversed upon the point in Germany, was the well-known Dr Louis Stromeyer, formerly professor of surgery in the university of Göttingen, and now professor at Munich, and surgeon to its excellent and truly elegant hospital. Upon stating to him that there were some oculists in London who were now declining to operate during winter, he expressed his surprise that it should ever have been otherwise, and remarked, that this abstinence had always been the rule in Germany; and upon our, in turn, exhibiting some little astonishment, and perhaps even incredulity, he desired us to inquire of his venerable colleague, Philip von Walther, under the persuasion that continued scepticism could not withstand his high and unexceptionable authority. A second individual with whom we conversed in the Bavarian capital, was Dr W. A. J. Schlagintweit, an old pupil of Professor Beer's at Vienna, and one of the most popular eye practitioners in Munich. He did not talk of the matter in altogether the same decided tone; but at the same time stated, that patients rarely presented themselves during the winter; and that they would not then operate, as the reflection from the snow was apt to act injuriously:—"If the weather," he said, "were mild in the months of October and November, I



would not decline to operate; but in frosty, or in keen, or variable cold weather, or in the heats of summer, I would never think of it." In Vienna, we had ample opportunities of pressing our inquiries, and found the responses there were habitually the same. Our friend Dr Kaskowski stated, that the rule was not to operate, or rather, not to perform any of the greater operations during the winter; but that this method of putting the matter was objectionable, as it did not give prominence to the principle which influenced them, and which was, that unless the weather were steady and good, and promised to continue so, they generally preferred waiting for more favourable circumstances. Thus, there might be three months in the depth of winter, and as many in the height of summer, when, from the intolerance of the heat, and the tendency to various epidemics, they would be disinclined to operate, unless there were some urgent call for it; and on such occasions they would exercise a double portion of watchfulness and circumspection to guard against unfavourable consequences. Dr Gulz again, Professor Rosa's assistant, to whom we were indebted for a course of privatissima lessons, put it in this way,—"We have no formal or positive rule not to operate at any period of the year. But then, as a matter of fact, we don't like to do it during the unfavourable and trying seasons of the year, nor, in fact, do we then operate much. Good and steady weather, with an agreeable temperature, is what we desiderate; and every thing that interferes with this—the cold and snowy weather of winter, the piercing and chilly blasts of spring, or the very hot season, or a very wet one, we try as much as possible to avoid; and hence, May and July, September and October, are the months we prefer; so much so, that the practitioners in the country, and even the peasants, are aware of our preference, and very much conform to it." In addition to all this, he stated that one of their most decided contra-indications against performing these operations, was the prevalence of almost any epidemic, such as catarrh or influenza, rheumatism, fever, or cholera, as the constitution of the season was apt to affect their cases injuriously. The only other German witness we shall adduce on this point is, Dr Adolphus Winter, the assistant of the illustrious Ritterich, and the house-surgeon of the beautiful Opthalmic Institution of Leipzic. He stated that, although it would be carrying the matter too far to say, that they never operated in the winter time, and though they would do so at any time, if circumstances required it, yet it was true that they operated very little between the months of October and March, both included; herein agreeing, almost to the letter, with the statements of Mr Tyrrell.

And as with the German authorities, so, to a considerable extent, is it with the French. Among the authors of this nation, Dionis, Wenzel, Delpech, and Dupuytren, all advise that care should be

taken in selecting a proper time for their operations, avoiding the extremes of heat, cold, and wet; in illustration of which, we shall here produce only the words of the Baron Dupuytren:— "Le Professeur attache la plus grande importance à ne jamais pratiquer l'extraction de la cataract sans avoir étudié soigneusement les circonstances atmosphériques, les influences de la température, et la constitution médicale regnante. Chacun sait qu'il est des temps où les opthalmies sont extrêmement communes, et il est très probable que l'opération serait alors suivie d' accidents inflammatoires." (*Leçons Orales*, t. i. 58.)

Finally, upon this point, we may mention that some of our old English surgeons were very particular in this matter, and selected the season, and attended to the weather with great care and caution; in proof of which we shall only select the following stanzas of the ingenious Banister, published in 1622, from Mr Middlemore's instructive page (ii. 124).

> "Couch cataracts upon a day so fair,
> That neither winds nor clouds disturb the air,
> When spring with smiles fills the earth's rich lap,
> Or autumn makes the tree put off his cap;
> The moon in the full, or in conjunction sly,
> Or tracing Aries, or in the Gemini."

Here, then, undoubtedly, is a strong body of testimony, domestic and foreign, all witnessing for the propriety, and the importance, of paying the greatest attention to the season of the year, and the state of the weather, at which the principal operations upon the eye should be performed, and condemnatory of the present prevailing practice in this country, of undertaking them at all times of the year indifferently.

And now, it might be expedient to direct attention to those states and conditions of the seasons which go to form the adverse agencies which affect the human frame, and produce those risks and hazards in operating upon the eye, to which allusion has so frequently been made. A full discussion, indeed, upon these points, would too much divert attention, and would occupy more space than we can allow in these pages; and possibly we might have ventured to have passed by the consideration of this branch of the subject altogether, under the impression that it must be more or less familiar to every one, were it not that some authors having assigned erroneous reasons for the insalubrity of the seasons, and for the mischief they produce, many individuals seem now disposed to doubt the existence, and to disregard the injurious effects of any such agencies altogether.

We observe, then, that all those well-marked conditions of the weather, which, in popular language, are characterized as *extremes*, by being far removed from that state which is steady and agreeable to the feelings, such as extreme cold, and extreme heat,



and, still more, extreme changeableness, as well as unusually damp weather, seem to bring along with them various influences which, in different ways, are apt to affect the human frame. Most of these influences seem, moreover, to act in two ways; both in a more direct and immediate, and also in an indirect method, by inducing well-known and defined diseases. If the weather be intensely cold, such an effect is produced upon our feelings and frames, that universal experience indicates that more than wonted care must be taken, by clothing and otherwise, to guard against the attending risks and dangers. Again, when the weather is extremely hot, a degree of lassitude attacks almost every one, the appetite becomes impaired, feverishness supervenes, sleep is disturbed, and the nights become restless. Remarks of a similar nature might be made concerning very damp weather, proverbial for its gloomy dulness, and for those lowering effects which it produces upon the health and animal spirits; while sudden changes from one of these states to another, only multiply the risks to which each exposes us. All this cannot be denied with regard even to those who are in the enjoyment of sound and robust health; the effects are still greater upon those who are weak and infirm; and are most of all severe, perhaps, upon those who, from being made the subjects of operation, are necessarily put upon the sick-list. As it regards the operations on the eye, some physical, we might almost say mechanical agencies, have occasionally been mentioned, and should not be overlooked. Thus, we have seen, that one eminent oculist assigns as a reason for not operating during the winter, that the reflection from the snow could not fail to be hurtful; and we are informed by another, a distinguished author, "That if we operate in very cold weather, the patient is apt to sit near a bright warm fire, and in this way the eye may become inflamed and injured."

But not less remarkable certainly, are those agencies acting in an indirect method, and inducing diseased conditions of the frame, some rapidly, others more slowly. Thus, the influence of cold and sudden change in producing catarrhal affections is universally known; and these, from the cough and sneezing they induce, are destructive of the slightest prospect of success in a case of extraction of the cataract. And common catarrhs being rife, catarrhal affections of the eye are usually found to prevail, a coincidence of easy explanation upon anatomical and physiological grounds. *Catarrhal* ophthalmia is well known to be one of the most frequent varieties that is met with in these countries, especially in the more trying seasons of the year; and its effects in the event of an operation at such times, could not fail to be a cause of dread. Similar remarks apply to another very frequent variety of the disease, namely, to *Rheumatic* ophthalmia. That the variations of the weather have great influence upon the health

and comfort of individuals of rheumatic habits will not be disputed. But rheumatism, not unfrequently, principally attacks the fibrous membranes of the eye, requiring special treatment, quite as much as when it assails the ankle or knee-joint. Considering how common rheumatic tendencies are in these countries, what might not be expected if, during the prevalence of cold and changeable weather, we, by an operation, place the organ of vision in such circumstances, that, being necessarily the weak part, it hence becomes the most liable to an attack of this formidable, and often unmanageable, disease. But probably the most striking, though not the most speedy, exemplification of the effects of cold and variable climate, is to be found in the great indigenous scourge of these lands,—in *Scrofula*, which is ever forcing itself upon the attention of the practitioner, and whose presence, in the diseases of the eye, is stated to be in the proportion of not less than 90 per cent. in the ophthalmiæ of the young. It is, alas! a too permanent taint in many; but proceeding pre-eminently from sudden vicissitudes of weather, it is undoubtedly greatly influenced and aggravated by them.

Such then, in a few words, is a specimen of the more marked and striking elements of the weather, operating injuriously upon the frame, and inducing an enfeebled and irritable state of the constitution, unfavourable to the success of operations. To this we have to add, that there exist other and more latent agencies, which, however obscure in their nature, and difficult to define and appreciate, sometimes produce a not less decided and injurious effect. These agencies have often been distinguished under the appellation of peculiar *constitutions of the air*, a phrase which is little more than a screen and apology for our ignorance concerning their real nature. Thus is it with that state of the atmosphere which, not unfrequently, makes *influenza* so common; producing catarrhal affections so much more severe than they are seen under ordinary circumstances, and often so fatal. So, not less distinctly, is it with *cholera*; a striking illustration of which occurred when the malignant variety first made its appearance in the Austrian capital. Though not a single case of the disease occurred in the ophthalmic wards, yet many of the eye-cases, which had been doing, and which promised to do well, from that moment began to go wrong, and turned out exceedingly unfavourable. So too is it probably with puerpural and various other low fevers, and morbid states, as in phlebitis, in which we are frequently called to witness peculiar affections of the eye, which are dangerous in themselves, and, not unfrequently, destructive to vision.

Concerning this little-cultivated and extensive subject, it ought not to be forgotten, that few remarks can be made alike applicable to all climates; and that every country and locality presents somewhat peculiar phenomena, whose history must be



studied, and whose injurious influences must be counteracted, respectively and individually. But upon the whole, there seems no room to question that extreme colds, heats, and changes, to which most climates are subject, but which occur no where more conspicuously than in our own; also, that the common vicissitudes of the seasons, so apt to induce catarrh, rheumatism, and scrofula, as likewise those more latent conditions of the atmosphere which are connected with, and probably produce such epidemics, as influenza, typhus, cholera, &c., all have an influence which may often prove injurious, and which, therefore, ought not to be disregarded by those who are solicitous for the success of their operations upon the delicate organ of the eye.

This remark introduces the question—What really are those Eye-cases, in which the consideration of time and season ought to form an element in our calculation concerning the propriety of operating?—an inquiry which, although it may have escaped the consideration of such as have altogether overlooked the efficiency of those evil agencies, must, as a matter of course, engage the attention of all who admit their influence and power. We have no thoughts of formally discussing this question, which might form the subject of a distinct memoir; but a few hints are absolutely requisite.

In answer to the question, it may be stated, in general terms, that this measure of caution is required in all those operations, in which experience has taught that the risk to the delicate organ of vision is considerable; a remark applicable to all those which may be designated the grand operations on the eye-ball, including, especially, the several operations for Cataract, more or less; and, in certain circumstances, those also for Artificial Pupil, and Staphyloma. A few words in further elucidation will be expedient.

In Cataract.—Notwithstanding the vast amount of attention which has been paid to the subject of cataract, and the labour and ingenuity which have been bestowed upon the various methods of remedying it, yet it cannot be denied that such is the skill and dexterity required, and the exceeding delicacy of the organ, that all possible means should be employed whereby success may be promoted and insured; an observation which is substantiated by what we believe to be an undoubted fact, namely, that the measure of success is usually commensurate with the degree of caution; in other words, that wherever there has been striking success, there has also been the extreme of fore-thought and of care.

For the removal of cataract, as is well known, three operations, differing somewhat in principle, are now practised, *Extraction*, *Solution*, and *Displacement*. The first of these is generally considered at once the most difficult, and the most perfect operation; and

in its performance, pre-eminently, all the caution which can be exercised should invariably be observed. Our chief object being to enforce this lesson of caution, and to impress upon the less experienced, that though the account of the operation may be simple, yet the execution is difficult; and that undertaken off-hand, and without the most minute attention before, at the time, and after the operation, much suffering, and failure, will probably be the consequence, we shall bring under notice a few of the instructions we received in Germany, concerning the indications and contra-indications for Extraction, which, however apparently minute and insignificant, ought to influence the surgeon in making up his mind, whether he will attempt to afford relief by this, or by some other of the proposed methods.

It is regarded almost an axiom at the Vienna school, that if the case be well selected, and the operation be adroitly performed, Extraction is, beyond comparison, the most satisfactory procedure for all concerned. At the same time, it is maintained that it requires considerable skill and practice; so that when individuals are so placed, that they have not every advantage, they are then prone to look about for arguments against it, and for reasons why other methods should be preferred; which, in reality, amounts to the admission that Extraction is too difficult an operation for them. Hence the rarity of good extractors, and these being almost confined to capitals, and other large cities, and to few even in them; hence so many preferring the other operations—seldom or never having recourse to this one; hence also the many objections brought against this operation, which those who are skilful in its performance know nothing about, finding it truly successful, and free from injurious consequences.

The greatest possible care, at the same time, must be observed in considering the circumstances which make for the operation, and against it. As it regards the *Cataract*, it should be hard, small, and free from morbid adhesions. If the lens be soft or fluid, this operation is out of the question. The hard cataract again is usually a small one; and unless this is the case, the operation should not be undertaken, because its exit through the pupil proves a great strain to the iris. Again, so long as adhesions exist, the cataract cannot escape; and if these are divided, too much irritation is produced. Professor Beer used to relieve these adhesions at the time he extracted; but the practice being found hazardous, it has been abandoned at the Vienna school. As it regards the *Eye*, it must be well formed for the operation. The conjunctiva must not be liable to disease. The cornea too must be quite healthy, and not too small, a peculiarity which sometimes presents itself independent of any disease: the pupil likewise must not be too small; and there must be no disease of the vitreous humour. One of the most frequent of the



morbid states of this humour, is an unusual quantity of the secreted fluid, and a want of the common healthy firmness and elasticity of the hyaloid membrane; and this again is often associated with an increased and abnormal size of the cornea, which is thinner than it ought to be. At first sight this state sometimes appears peculiarly favourable for extraction; but in reality it is the very reverse; the wound of the cornea not healing kindly, and the vitreous humour altogether escaping. The patient must not be peculiarly nervous, and not liable to spasm, or oscillation of the eye. Then the *Constitutional health* must be carefully examined; that there exists no serious latent indisposition, no asthma, no recurring cough, no tendency to sneezing, and that the patient has the power of sleeping upon his back, as this is the position which is absolutely required. Then, the operation should never be undertaken upon any person who cannot enter into the importance of great care under the circumstances; nor should the patient be too timid, nor too bold, so that he is likely to take liberties with himself. Some individuals are bad subjects from mere restlessness. Then, there being direct sympathies between the skin and the cornea, every disease of the former constitutes a contra-indication; as does also the *habitus vulnerabilis*. And lastly, as it regards more general circumstances, it is a great matter that the operator shall have a good assistant, who understands his duties thoroughly; what the operator is doing, and what he himself should do and should not do. Then the patient should be under the ready and constant superintendence of the surgeon. It would not do for the surgeon to operate in the country, unless he will remain there; nor should he be running out of town after the operation. Then it is important that the patient should have a good nurse, who is all alive to the importance of her duties, and will faithfully and rigidly perform them. The neglect of the nurse has often proved the destruction of the eye. Finally, as already hinted, the season of the year must be favourable, and no epidemics prevailing. In these few sentences, no one will for a moment suppose that we supply anything like a full enumeration of the indications and contra-indications which are propounded at Vienna. This would be altogether wide of our present mark. We have purposely avoided many of the most important, and of those with which, in this country, we are familiar; and have adduced the foregoing, simply with the hope they may excite attention to the minute nature and character of that care which is regarded necessary by the most competent judges; and from which the conclusion seems direct, that if these expert oculists, in this most renowned school, deem it expedient scrupulously to attend to such matters, then, assuredly, they should not be slighted elsewhere by others.

Another hint, bearing upon these minute matters, we shall furnish, as derived from Berlin, and which applies to the exposing of the eye-ball in this, and often in other operations. It consists in this, that as the application of specula is ofttimes painful, and the cause of annoyance, under important circumstances, to the patient, they should be entirely discarded. Nor are the fingers, nor ought else, to be used directly as substitutes. The elevation of the upper lid, to which our present remarks apply, in many instances is the most important, and can always be done by an assistant. The substitution for the speculum is managed in this way. The assistant, standing behind the patient, commences the retractation of the integuments, fascia, and anterior fibres of the occipito-frontalis muscle, upon the forehead, by means of the fingers of both hands, advancing inch by inch, till he has reached, and somewhat passed the superciliary ridge, by which time the upper eyelid is under his finger, and all that is required is gained without giving uneasiness, the upper part of the globe being freely exposed, and the edge of the eyelid, and its lining membrane, instead of being irritated and bruised by the speculum, are never once touched by the finger. Thus the painful and more important parts of any operation are begun under favourable auspices, a point which may be regarded trifling by some in this country; not so, however, we can affirm, in the school of Jüngken.

One other suggestion belonging to the same class of minute carefulness, we shall adduce in the words of Mr Tyrrell, a gentleman who at present stands pre-eminent, in this country, for his success in operating for cataract:—"Some persons," remarks this gentleman, "have such a habit of rubbing or pressing the eye, that it is best to confine the motions of the hands, after the operation is finished, by tapes fixed by one extremity to the side of the bed-frame, and by the other to the wrist, and of sufficient length to allow the patient to convey the hand to the mouth, but no higher. I have several times known," he adds, "mischief to occur from the want of some precaution of this kind" (ii. 405); a recommendation which we have nowhere else seen either advised or practised.

Respecting the treatment of cataract by *Solution* of the lens, it is certainly an operation of much less risk than that of extraction, and yet a measure of care should be taken even here. In some degree as illustrating this, and conspicuously, the more general subject under review, we may mention another proposal which was first made, we believe, by Mr Tyrrell, and which we know is now practised by the officers of the Royal London Ophthalmic Hospital. We have noticed above, that one of the indications for the operation of extraction, is, that the cataract should be small, as well as hard. This, however, is not always



the case; and when the lens is large, the gentlemen alluded to have adopted this kind of compound operation. During the latter autumn or winter months, weather permitting, they perform the operation, in such a case, as if for solution only; making their incisions in the capsule, and of the lens, in the gentlest way; not with the expectancy that this will eventually remove the indurated cataract, but solely in the anticipation, that, during the course of the intervening months, in which, for the reasons above assigned, they would have done nothing at any rate, the aqueous humour may exert its influence in removing the softer parts of the lens, whereby its size will be reduced as desiderated, for effecting the extraction in summer, at once without risk, and with facility and success. This appears to be an excellent suggestion.

And lastly, with regard to the operation of *Couching* or displacement, which, notwithstanding all that has been alleged in its favour by the French, we consider, with the Germans, the most objectionable of the three, so frequent are the immediate injurious effects, and still more those which are apt ultimately to follow, that we conceive every care and caution should invariably be employed in its performance. Of course, we mean not to deny, that, frequently, it is the most appropriate method; but when we consider the damage done to many important parts by the common operation, we cannot wonder it is often followed by long protracted and afflictive suffering. How far the modified method of practice long extensively followed by Mr Egerton in Calcutta, and so successfully adopted by Mr Morgan in London, will meet this objection, we cannot say, though this proposal is well worthy of the most attentive consideration.

We have already so far exceeded the limits we originally contemplated, that little space is now left for dwelling upon the subjects of *Artificial Pupil* and *Staphyloma*. One observation is especially applicable to these diseases, and might frequently also be extended to some cases of cataract. It is this, that the necessity of every caution is often much enhanced by the consideration, that we are called to interfere with the eyes, not in their normal and healthy condition, but with those which have undergone serious morbid changes, so that their irritability, and tendency to derangement, are greatly increased. What could be done with impunity in a sound eye, is in these followed with most distressing consequences. And when to this we add, that, in many of the cases now under review, the patient frequently has but one eye left, and that one little better than useless, whilst the faint glimmer of light he enjoys is generally valued in the ratio of its very paucity, we cannot but see how anxious the surgeon ought to feel that he does not quite destroy that which is so highly esteemed. Many cases of *Staphyloma* are pressing in their nature, and must be relieved on the moment; but others are not so; and

in them, as well as in cases of artificial pupil, and in the operations for cataract, abundant opportunity is afforded to select those times and seasons which prudence and experience declare to be the safest and the best.

We have hitherto dwelt chiefly upon the *doctrine* of the German schools; but it is of consequence to add, that their *practice* corresponds with their precept; and that, according to our observation, it is impossible not to be struck with the superior degree of attention they bestow upon every minute circumstance which bears upon the success of their operations. The professional traveller, we apprehend, cannot fail to remark this, in visiting their ophthalmic hospitals, and the ophthalmic wards of their general hospitals. For example, the auditorium for the clinical practice in the great civil hospital in Vienna, is coloured green, and the windows are supplied with peculiar shutters and curtains, so that the light can, in a moment, be regulated according to the character of the weather, and the exigencies of particular cases. The eye wards are likewise coloured green, and are furnished with every thing necessary for the peculiar care of patients afflicted with the diseases of this delicate organ; they have their especial shutters and curtains, and each bed has a moveable screen, which regulates the light as each case requires. The nurses are of the highest character, and the resident ophthalmic doctor is always on the spot, and at command. These remarks might be extended to all the German hospitals, as to those at Munich, Prague, Leipsic, Heidelberg, &c. We are probably speaking in the hearing of some who have seen, and can never forget, the scrupulous care of the eminent Chelius at the last-named school, and who can recall to their recollection his visits to his ophthalmic wards, where the light is so carefully moderated, or so effectively excluded; the window curtains being drawn aside as the professor requires light, and visits case after case—now more being afforded, now less; his entering the screen about the bed, and arranging it with all possible nicety; the shading-cap he puts upon the foreheads of his patients, beneath which he examines the state of the wounds, and the amount of increased action; the care with which he himself washes and dresses the parts, and all being well finished, again places his patient in that degree of shade which promises to be most useful. This is a very different amount of care and minute attention from that which are usually supplied among ourselves. And what is the motive which suggests it? It is not done for effect only; it is not a mere formal routine. It is the result of the mature experience of the most eminent and successful European surgeons,—of those whose celebrity is built upon such assiduous care and minute attention, as that for which we plead.

And is there not, in many points, a contrast between this and



what we are familiar with among ourselves? What success can we expect in our great general hospitals, where so many of the requisites of the foreign schools are disregarded and neglected? What are we to expect from our eye dispensaries, where these operations cannot be performed within the walls of the establishment, and whence often we follow the poor patients to their ill-provided houses, and operate there, in the midst of privations, (especially as to superintendence,) and of the disturbing influences to which they are necessarily exposed? Is it not most desirable, that, in all our large towns, and still more wherever there is a great medical school, there should be a well furnished, and well regulated Eye hospital, where these practical lessons could not only be didactically inculcated, but actually enacted before the eye, and even under the immediate care of the student? It is only, we apprehend, by the adoption of such methods as these, that we can expect to see Ophthalmology thrive among ourselves as a science and an art, and as the exigencies of the sufferers around as require.

To conclude, we trust we have now said enough to attract attention to this interesting topic; and without recapitulation, we leave to the reflection of our auditors the proposal, that more minute care than is usually given should be bestowed upon the conduct of the principal operations on the eye, including, among others, that degree of attention to times and seasons which is exercised in other countries, by the most illustrious oculists and surgeons of the day.

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*(Extracted from the Lond. and Edin. Monthly Journal of Medical Science for March 1843.)*

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UPON

# EXCISION OF THE SUPERFICIAL LAYERS OF AN OPAQUE CORNEA,

## AS A METHOD OF RESTORING VISION.

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EXTRACTED FROM THE
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# ON EXCISION OF THE SUPERFICIAL LAYERS OF AN OPAQUE CORNEA, &c.

(*Read before the Medico-Chirurgical Society of Edinburgh, Feb. 9, 1844.*)

Last session, I ventured to bespeak the favourable regards of this Society to some recent suggestions for the improvement of ophthalmic practice; and with this object in view had the honour of reading two short memoirs,—the one upon the minute care to be observed in undertaking the principal operations on the eye, referring particularly to the times and seasons at which they may most safely be performed; and the other, upon the cure of inveterate pannus, by the inoculation of the matter of blenorrhœa.[1] Another subject I had then especially in view, was the one just announced: but fearful of making unbecoming demands upon the patience of the Society, I postponed its production to the present time—a course which is all the more fortunate, since, during the interval, together with many of my fellow-members, I have had the pleasure of much personal intercourse in this city, with my amiable and talented friend Dr Gulz, whose success in the not very rare, and truly distressing circumstances on which we are about to dwell, forms a prominent part of the present brief communication.

Dr Gulz, lately *chef de clinique*, and assistant to Professor Von Rosas at the great Ophthalmic Hospital in Vienna, has lately succeeded in restoring vision to one of those unfortunate individuals who had become blind from extensive opacity of the cornea, by excising the opaque anterior portion, leaving only the posterior normal part, which healed without losing its transparency, and left permanently a clear aperture available for all the purposes of useful vision. This success to an almost unlooked-for extent, together with very decided relief in some other cases, has led him to anticipate a like result in similar instances; and has induced him to support the thesis, that there are cases in which excision of the

[1] Monthly Journal, vol. for 1843, p. 201, and p. 379.

opaque cornea will be effectual in restoring permanent vision to the blind. This important proposition in ophthalmology, together with a brief narration of the cases just referred to, will form the subject-matter of the following memoir.

It is of primary importance that the *precise nature of the cases to which the proposed method is applicable* be clearly understood; as otherwise, mistakes and injuries will be the necessary consequence.

In these cases, then, as in the somewhat allied class belonging to the head of artificial pupil, it is absolutely necessary, that the *sentient portions of the eye be in their normal condition*, and that the defect of vision arise solely from some obstruction of a mechanical nature interfering with the admission of the rays of light. The morbid conditions inducing such obstacles need not here be enumerated; but in all, though the obstacle to distinct vision be complete, yet the perception of light must never be destroyed; and the practical surgeon will seldom or never have any difficulty in discovering whether the nervous parts of the organ still preserve their integrity.

Again, and to be somewhat more particular, there must be no *anterior synechia*, nor any *closure of the pupil*. No words are necessary to enforce this proposition. Were the cornea rendered ever so clear, both the abnormal states here specified would form insuperable obstacles to vision; and we are not yet in a position to advise that the operation on the cornea should be attempted, in the hope that a second one for artificial pupil might restore the sight. The existence of *staphyloma*, we may add, must always diminish the prospect of success. With the majority of oculists, we hold that in staphyloma the iris is usually involved, adhering to the remaining cornea, or to the cicatrix-tissue which supplies its place. Notwithstanding this unfavourable state of matters, it is interesting to know, that some such cases have been noticed in which very tolerable vision has been retained. Two instances of this kind will be brought under review in the sequel, so that even in these cases all hope must not be abandoned;—hence then, the appropriate cases for the method about to be detailed are reduced to those affections of the cornea which are classed as *simple opacities*. And even here it is necessary to discriminate. The obscurity of the cornea arising from the thickening of its conjunctival covering, constitutes the proper pannus of oculists, and is to be treated upon the general principles alluded to in the paper previously read to the Society. The slighter varieties of opacity, whether of general cloudiness or of local film, and even the more obstinate forms of albugo and leucoma, must be treated upon other principles; and hence the fitting cases for this operation come to be those in which there is a very considerable obscuration of the cornea proper, covering the whole surface of the membrane but not extending throughout its entire thickness, without synechia, and with the integrity of the sentient apparatus.



And such cases are unfortunately too common. They are found in strumous subjects as the result of that obstinate disease known as the vascular albugo of oculists; also, of Egyptian and other virulent purulent ophthalmiæ; likewise, in cases of severe corneitis, with effusion of blood and lymph between the layers, and, not to dilate more, in certain of those cases of violent inflammation, induced by the introduction of lime and such matters, which, by their chemical action, almost immediately destroy the superficial layers of the membrane, and penetrate to a certain but limited extent. The result of accidents and diseases such as these, is to induce a state of the cornea, in which useful vision is lost, and where all attempts at relief are usually abandoned in despair.

Certainly it is not a little vexatious to the surgeon to know, that in all these cases the more noble and important parts of the organ are still entire, and that a mere chink or aperture is all that is desiderated for satisfactory vision. It is this condition of the parts which has led the first oculists of their time so much to tax their ingenuity and skill in endeavouring to overcome the apparently trifling obstacle;—that led the University of Munich to offer an honorary prize to the individual who would indicate how the difficulty might be overcome;—that has led such men as the elder Autenrieth, Beer, Ammon, Henle, and Guthrie, in cases of opaque cornea, and of staphyloma, themselves to undertake, and to recommend to others, the operation of *sclerectomia*,—the operation of simply removing a minute portion of the sclerotica and choroid, near the corneal margin, so hoping for a vicarious or artificial pupil;—or the modification proposed by the celebrated Wutzer of Bonn, of substituting, in the same spot, after the Talicotian method, a portion of the transparent cornea instead of the natural and opaque membranes;—that has moreover led Feburc, and more recently Dieffenbach, to advise, and, it is stated,[1] successfully to execute the complete excision of the central opacity of the cornea, and to unite the lips of the wound thus made by sutures;—and finally, that has led Reisinger, and more lately Dr Biggar of Dublin, to propose, and in the lower animals, to execute with success the removal of the opaque cornea, substituting a transparent one in its place, and so restoring useful vision.[2] All these anxious and persevering efforts of ingenuity and skill must, we fear, be conceded to have failed; and hence the proposal before us will readily be received with a larger share of favour and consideration.

The *history* of this proposal, we believe, is as follows:—

The ophthalmologists of Vienna were not, of course, ignorant of the state of the science regarding the class of cases on which we have been dwelling, and particularly respecting the forms of simple

[1] See Stoeber, Man. Prat. d'Ophth., p. 266; Ammon's Zeitschrift, i. p. 177.

[2] See Dr Biggar's able Inquiry into the Possibility of Transplanting the Cornea, in the Dublin Journal of Medical and Surgical Science, vol. xi. p. 403. 1837.

opaque cornea, and the methods which have been proposed for remedying the distressing complaint. Meditating upon the peculiar texture and organisation of the cornea, and upon that variety of the disease we have indicated above, it had long been the opinion of Professor Von Rosas, that the diseased part of the cornea might be sliced away, so leaving a clear portion beneath; and, moreover, that this operation might so be managed that the resulting increased action would not produce a new film, but leave the parts in a translucent or transparent state.

This speculation was converted into a kind of certainty, by there appearing at the Clinical School, in the year 1833, a man in whom the left eye was atrophied, and whose right exhibited a complete obscuration of the cornea, with the exception of a small portion in its centre about the size of the natural pupil, which was clear, and which served all the useful purposes of vision. Here the unaided powers of the constitution had wrought an excellent cure; and art was as it were challenged to accomplish that which nature had so well effected.

Accordingly, in the Ophthalmic Clinic of the session 1833–4 Professor Rosas undertook the performance of this operation in two cases. In the former, he may be said to have removed by far the greatest number of the layers of the cornea, and the trial was not unsatisfactory, inasmuch as the patient was quite cured of his wound, and left the Hospital with very decided improvement of sight. The subsequent history of this case, however, was unfortunate. It was ultimately ascertained that after leaving Vienna, fresh inflammation attacked the eye, and the advantage which had been gained was completely lost. In the latter, the external and opaque layers of the cornea only were removed; the remaining part was found in its normal state, the healing process advanced to its close without any opacity being superinduced, and a cure was effected by means of a clear membrane. Six months afterwards it was ascertained from good medical authority, that the patient continued to see as well then as he did upon leaving the Hospital. In both these cases, the greatest care was taken after the operation to regulate the re-action which necessarily followed, by the antiphlogistic regimen, and by cooling local remedies.

In subsequent years the operation was occasionally performed with mingled, rather than with marked success; but with a sufficient measure of it to encourage still farther trials.

The next event in the history of the proposal to which we have to direct attention is a case which presented itself in the Ophthalmic Clinic of Vienna in the session 1841–2, and which fell under the immediate care of Dr Gulz. In this instance, there was a cure effected in both eyes; in the one, which was in a staphylomatous state, by nature; in the other, by the hand of the surgeon: and so far as our knowledge extends, this is the most detailed and remarkable instance of the success of the method which has hitherto occurred.



Salomon Maschkowits, Oct. 28,[1] from Hungary, a tailor by trade, of leucophlagmatic temperament, and having about him the traces of struma, two years previously was attacked, in his native country, with purulent ophthalmia, after being in frequent and close communication with a fellow-workman labouring under the disease. For the cure of this complaint he resorted to an hospital, from which, after a treatment of eighteen weeks, he was dismissed, with no greater power of vision than that of distinguishing between light and darkness. After dismissal, as might be expected, there was no improvement, but the reverse. The left eye gradually augmented in size; the corneal portion at the same time projected more and more, and the blindness continued as bad as ever. These symptoms advanced for about a month, when, one morning upon awaking, the patient, to his great joy, observed that he could perceive objects with his left eye, though it was more than ordinarily tender and painful. From all that could be learned, and from a careful examination, it appeared that the ophthalmia had produced spherical staphyloma in this eye, which ran its usual course, getting larger and larger till at length it had burst, after which the cicatrization had finally stopped at that stage in which there was the formation of a transparent membrane, a termination not more fortunate than rare. At all events, upon his presenting himself at the Vienna Clinic, this eye was found with the remains of a genuine staphyloma, the most projecting portion of which was smooth, as if it had been shorn with a plane, also transparent and shining, to the extent of half a line; so permitting the passage of light to such an amount that the patient could readily distinguish larger objects and colours; and clearly demonstrating that there are circumstances in which, even after the rupture of a protruded cornea, with adhesion of the iris, a clear and useful aperture might still be left.

The disease in the right eye had run a different course. The external layers of the cornea had been more or less inflamed, ulcerated, and destroyed, and the healing powers of nature had operated by substituting in their place a substance, whitish and opaque, over the whole surface of the cornea. On the patient's presenting himself at the hospital, granulations were found in the palpebral conjunctivæ of both eye-lids, and the right cornea was somewhat flattened, in all its extent obscured by a cicatrix, the result of the previous ulceration, whilst at the same time, the organ readily discriminated between light and darkness. It was thought, or at all events, hoped, that the obscuration and ulceration of texture in this instance did not extend throughout the whole depth of the membrane; and the case was deemed a fair one for attempting what could be accomplished by the slicing off of the opaque portion of the cornea and leaving the transparent part as little injured as possible.

[1] Dr Gulz read the history of this case to the Medical Society of Vienna, and published an account of it in the Oesterreichische Medicinische Wochenschrift, No. 24, June 1842.

As preliminary to any thing in the shape of operation, the removal of the granular state of the palpebral conjunctivæ, with the consequent inflammation, was first essayed, and accomplished without difficulty.

The operation was performed by Dr Gulz, under the direction of M. Von Rosas, in the following manner;—the instruments employed being the cataract knife, with a double cutting edge of Rosas, and the pyramidal knife of Beer, together with a small toothed forceps, and a delicate pair of scissors. The eye-lids of the patient were conveniently fixed by the fingers of an assistant, and the cutting consisted in the continuous and repeated introduction of the knife, following the motion of the eye-ball through the external layers, so gradually approximating the internal parts of the cornea. The manœuvre required to be repeatedly and adroitly performed, until the transparent part of the cornea was at length reached; it was then, by the help of the different instruments, bared to the extent of a line and a half in diameter, the innermost layers of the cornea being fortunately uninjured throughout, and consequently the anterior chamber of the aqueous humour remaining unopened. The operation occupied about a quarter of an hour in its performance; and after its completion, the vision was improved to such an extent that the patient could perceive different shades of colours, and the smallest objects, such as the hands of a watch, with facility.

The subsequent treatment consisted in the application of plasters over the eye-lids, so preventing their motion; these again were covered with cold and ice-water, to moderate every thing like excess of action; the patient was placed in a dark room, and the strictest regimen was enjoined. All appeared to progress favourably, and no alteration was made during the first eight days. At the end of that time the plasters were removed, and a collyrium, first of a solution of hydriodate of potash, (1 gr. to the ounce,) and subsequently of the solution of muriate of ammonia, was used.

All went on most promisingly for the first four weeks; after which the eye was attacked with ophthalmia, the result probably of cold, or some irregularity in diet. The inflammation invaded the iris as well as the cornea; and to such a degree, that the thinned cornea was pushed forward, forming a keratocele, to such an extent that the bursting of the membrane was seriously apprehended. By venesection, however, leeching, and the application of solution of alum and ice, and by the use of calomel internally, the danger was arrested and the attack subdued. In a few days the vision, to the great joy of all parties, was found uninjured; and after the additional period of five months, it continued to exhibit the same degree of perfection which was enjoyed previous to the inflammatory attack.

The patient, as may be expected, is near-sighted, requiring to hold objects near to the eye, and to place them in a good light. This is readily explicable, from the greater convexity of the cornea, the small size of the pupil, and from the fact that the new made



aperture is somewhat more distant from the retina. Glasses could effect much in these circumstances; but even without them, the amount of vision is most satisfactory, and to the patient invaluable.

On examination, the white and opaque portion of the cornea near its centre is found removed, whilst the internal transparent part preserves its natural appearance. In this way, much of the old deformity is removed; so that in addition to the more substantial benefit of good sight, the general appearance of the patient is greatly improved.

Concerning this operation and its fortunate results, nothing is further from Dr Gulz's mind, than the assumption of any supposed merit arising from the dexterity of its execution, or the superior wisdom with which the after treatment was conducted. That it requires considerable dexterity and steadiness of hand is undoubtedly true, and not less, great attention and care in the after treatment. The claims of the case to consideration, rest mainly perhaps on its comparative novelty and rarity, and especially on its unexpected success, whereby the utility of the art may be extended, and not a few miserable sufferers restored to comparative enjoyment and comfort.

On the *rationale* of the success in this, and the few other similar cases here recorded, it is unnecessary to dwell. It is clear that the opaque cornea, which is the subject of operation, is far from being in its normal condition; and even when the lower and transparent portion is reached, it is surrounded with an opaque areola very different from the healthy cornea. As throwing additional light on this important point, we quote a case which occurred in the extensive experience of the late Mr Tyrrell. A man, aged 37, applied to the Moorsfield Hospital, having acute purulent ophthalmia of the right eye, with commencing disease in the left. Severe depletory measures were adopted, but in forty-eight hours afterwards, sloughing had commenced in the right cornea, and there was chemosis of the left, with haziness of the upper part of its cornea. Further depletion, and other remedies, were had recourse to, and the inflammation was subdued, but not before a part of both corneæ had lost its vitality. The separation of the sloughs left deep ulcers of a crescentic figure at their upper margins, which in the right communicated with the anterior chamber, producing prolapsus of the iris, which was reduced by belladonna. The reparative process was excited by the use of local stimuli and improved diet; and instead of the usual deposit of opaque matter, the cavities were gradually filled up with a perfectly transparent substance, resembling very much the original texture. Two years afterwards, the man returned to the hospital, at which time some very slight irregularity of the surface alone indicated the previous seat of the disease.[1] The opaque and normal condition of the cornea, therefore, though from

[1] Tyrrell on the Diseases of the Eye, i. 261.

circumstances a common, is not at all a necessary preliminary of the cure; and the conclusion, as it regards both the more chronic and the acute cases, is evidently this, that what nature can do, art should attempt to imitate.

From our present very limited experience, it is not easy to draw any very decided conclusion as to the amount of benefit likely to accrue from the practice now proposed. That our art, in cases of severe and chronic cases of opacity of the cornea, is considered ineffective and powerless, by the great majority of authors and practitioners, is beyond a doubt. Beer and Walther, high continental authorities, contended, we believe, that all prospect of success in such cases was chimerical,—a proposition whose accuracy, however, was contested by Scarpa and Von Ammon. British surgeons, as will readily appear from a reference to their works, are almost unanimous in expressing their conviction that benefit in such cases from any remedial means now employed is not to be expected. We shall exhibit these sentiments in a couple of sentences recently written by two of our most respectable authorities. "Ulcer of the cornea, extending at all deeply, is followed by some degree of opacity, which can never be completely removed at that part where a considerable number of the corneal layers have been destroyed."[1] And again, "It is useless to attempt, by medical or surgical means, the removal of these dense opacities."[2] Such opinions, though weighty, are fortunately not conclusive, else there would have been long ere this time an arrest to all progress in the healing art. Sound judgment and discretion must here guide and direct on the one side as on the other. That such cases and proposals as those above detailed, should be received with much careful scrutiny, we not only allow, but would enforce. That, on the other hand, they should be met with blind prejudice and impatience, we are equally prepared to deprecate and condemn. We cannot probably better convey our own sentiments on the point, than in the remarks with which Dr Gulz concludes his account published in June 1842. By the foregoing case, says this able oculist, the possibility of obtaining a clear aperture in the middle of a generally opaque cornea by surgical operation, and in certain cases of staphyloma, which may be styled *kerectomio*, is placed beyond a doubt. And that this will frequently prove of incalculable value to unfortunate sufferers, can as little be matter of dispute. Such cases, usually abandoned to their sad lot, are not very uncommon in society, and too often, in the long run, find their way to the poor-house or some blind asylum. They will, moreover, ever be recurring to our notice, so long as the cornea is exposed to so many accidents from without, is so often the subject of purulent ophthalmia, and the still more frequent ravages of disorders of scrofulous origin. The suggestions here offered, and the operation accomplished, are as yet only on their trial; I cannot, however,

[1] Middlemore on Diseases of the Eye, i. 180. [2] Tyrrell, op. cit. i. 263.



but entertain the hope, that from the wonted energy and combined efforts of those who are favourably situated for investigating these subjects, they will ere long assume an honourable position among the remedial agents for the management and cure of ophthalmic disorders.

After the treatment of the several cases above referred to between the years 1834 and 1842, and the publication at length of the last of them in June of the last named year, in one of the leading journals of Europe, and its notice unquestionably in others, it is not a little curious that the celebrated Parisian surgeon, Malgaigne, could, on the 3d April 1843, entertain the Académie Royale des Sciences, with such intelligence as the following, reported on by MM. Roux and Breschet:—"When opacities of the cornea," says M. Malgaigne, "are of long standing, and have resisted all remedial means, Surgery, up to the present time, has owned its incompetency to afford relief. At the same time, numerous dissections have satisfied me, that, generally, these opacities affected only the external layers of the cornea, and that the internal ones remained transparent. Hence the question naturally arose, If it were not possible by the knife to remove the abnormal layers? To this there was but one objection, viz., that the newly made wound might leave an opacity as bad as the previous one. Bearing, therefore, on this point, I undertook a series of experiments upon living animals. I removed about half the thickness of the cornea, and in the end preserved a cicatrix, which was perfectly and absolutely transparent. Here, then, is one new fact reaped for science!

"Satisfied upon this point, I conceived myself entitled to apply the fact to the human subject; and I have now performed one operation upon a girl in the Clinical Hospital, where I had the honour of acting for M. Jules Cloquet. No sooner was the incision concluded, than the girl exclaimed that she had received her sight.

"I limit myself at present to the mention of this first attempt to the Academy, and at a future period will furnish the ultimate results of these operations."

I cannot forbear making a remark or two upon this note of M. Malgaigne.

Here we have one of the most distinguished surgeons of Paris condescending to make *L'Académie des Sciences* the arena in which he lays claim to the discovery of a new fact in science, as it regards the lower animals, and its first and successful application to the removing of an important defect in man, in his young patient of the Clinical Hospital, and using the *Comptes Rendus* (t. xvi. 659), and *L'Archives de la Médecine*, as the vehicles of publishing his discovery throughout the world. The complacency with which this is done—for we would avoid all harshness of expression—is not a little interesting. Are we to suppose that the operations above reported from the Vienna Ophthalmic Clinic, and their publication nearly a year before, were unknown to the Parisian surgeon? And, are we

to conclude, that M. Malgaigne was ignorant of the fact, that it is one thing temporarily to remove a mechanical obstruction to vision by section of the cornea, and another to maintain this happy result in permanence and perpetuity? A direct answer to these inquiries would be both curious and instructive. We should be unwilling to imagine that any French surgeon would be slow to concede scientific merit to others, and especially to foreigners, where that merit was due. And sure we are, that if an offence of this kind, at any time, through inadvertency, or otherwise, appears in the commonwealth or literature of science, it should, on all hands, and promptly, be exposed and redressed.

*P.S.*—Since the foregoing observations were written, I have read in the late numbers of the *Annales d'Oculistique*, *first*, A criticism, communicated to the Académie des Sciences, of M. Malgaigne's *Memoir*, by M. Desmarres; and, *secondly*, Remarks to the same learned Academy, by M. Magne, on the sentiments of M. Desmarres.

We subjoin, in a few words, the opinion of these gentlemen.

M. Desmarres proves incontestibly that M. Malgaigne's claims to novelty of discovery are baseless, and that both Dr Mead and Baron Larrey have stated that the practice has succeeded in their hands. Notwithstanding this, he contends, somewhat inconsistently, we should think, that the practice should invariably be proscribed, except in cases where central opacity is the result of the deposition of oxide of lead, or other such substance, and that the operation for artificial pupil should in all instances be preferred. But how could any operation for artificial pupil be available in the many cases in which the opacity extends over the whole surface of the cornea?

M. Magne again contends, that all cases of leucoma are incurable by this, or by any other method; but, on the other hand, that albugo is curable by nitrate of silver without the knife; whilst, in those cases in which the opacity extends over the whole surface, he considers that the surgeon is warranted in making the attempt here discussed, to relieve.

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# EXCISION OF THE EYEBALL IN CASES OF MELANOSIS, MEDULLARY CARCINOMA, AND CARCINOMA;

## WITH REMARKS.

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In the course of my practice, I have been called upon to perform the operation of excision of the eyeball in sixteen of the following cases, in which that organ was affected with diseases reputed malignant:—

| | | | | |
|---|---|---|---|---|
| | *Melanosis.* | | | |
| 1. | James Cowan, | æt. | 50, | cured. |
| 2. | Jane Murphy, | ... | 58, | cured. |
| 3. | Alexander Nicol, | ... | 47, | cured. |
| 4. | David Wilson, | ... | 52, | cured.* |
| 5. | John Cross, | ... | 49, | doubtful. |
| 6. | Mrs Kerr, | ... | 55, | cured. |
| | *Medullary Carcinoma of the Eye.* | | | |
| 7. | Elizabeth Williamson, | æt. | 8, | returned. |
| 8. | Jane M'Pherson, | ... | 1½, | returned. |
| 9. | Peter Johnston, | ... | 5, | returned. |
| 10. | John Richardson, | ... | 4, | returned. |
| 11. | John Graham, | ... | 56, | cured. |
| | *Scirrhus and Medullary Carcinoma of Appendages of Eye.* | | | |
| 12. | James Grant, | æt. | 60, | cured. |
| 13. | John Williamson, | ... | 62, | returned. |
| 14. | Robert Wilson, | ... | 60, | returned. |
| 15. | William Ross, | ... | 50, | cured. |
| 16. | Mrs Walker, | ... | 62, | cured. |
| 17. | Grizzel Syme, | ... | 60, | died. |

### Melanosis.

It is only since the beginning of the present century that the attention of the profession has been directed to this peculiar morbid condition, and its true characters are as yet in a great measure unknown.

* Operated on by my colleague Dr Duncan.

Müller, in his work on Cancer, considers it as a mere variety of that disease, and terms it carcinoma melanosis. It would appear, however, that he has come to this conclusion without sufficient data. The only fact indeed which he adduces is, "that he has often seen carcinoma reticulare of the eye and of the orbit combined with melanosis, some lobules of the morbid growth being more or less completely occupied by melanosis, while other parts displayed the ordinary network made up of white corpuscles characteristic of carcinoma reticulare."

Although in many cases we find tumours of a truly carcinomatous character, more or less spotted with melanotic matter, or even with masses of this substance deposited in them, and though such tumours are accompanied by all the pathognomonic symptoms of carcinoma, and follow the usual course of that affection, nevertheless these circumstances afford no proof of any similarity between the two deposits, or of any necessary connexion between the two diseases. On similar grounds we might arrive at the conclusion, that simple fibrous tumours are a variety of carcinoma, because we often meet with these taking on a malignant action, and find a carcinomatous deposit in their structure.

On the other hand, cases of pure melanosis are constantly occurring, which do not present in their structure, or in the symptoms which attend their progress, almost a single symptom of carcinoma.

Melanosis is, in so far as is known, an unorganized mass, neither vessels nor nerves being to be traced into its substance. Hence it is incapable of assuming any morbid action, or of propagating such to contiguous parts, and produces no effects but what are dependant on its mechanical agency. In all of these respects it differs most essentially from carcinoma. In melanosis no pain is complained of but what may justly be attributed to the effects of mechanical pressure or distention. Hence, when seated in parts of a loose texture, little or no suffering is experienced; or, if seated in parts of firm texture, in which it gives rise to pain from distention, that pain is at once relieved by removing the state of tension, as by incision. This occurred in two cases within the eyeball, in which the pain, tension, and throbbing, under which the patients suffered, were at once abated by a puncture allowing the escape of a portion of the fluid contents of the eyeball mixed with the melanotic matter, thus showing that the pain was not seated in the deposit, but was dependant on its mechanical action. In carcinoma, on the contrary, the pain is in the tumour itself, is not caused by distention, nor is it relieved by incisions. Melanosis by its pressure may effect the absorption or ulceration of the surrounding parts, but these do not, as in carcinoma, assume any peculiarity of action. When the skin covering a melanotic tumour gives way, it appears to be by absorption. The edges of the opening thus formed in the skin are neither everted nor thickened, the discharge is without fetor, there is no hemorrhage or sloughing, there are no fungous



protrusions, and the growth of the tumour is owing to the vessels of the surrounding textures continuing their abnormal secretion. In carcinoma, on the contrary, the skin becomes affected with malignant ulceration, and fungous protrusions take place, accompanied by fetid discharge, hemorrhage, and sloughing.

Although melanotic deposits are often met with, in the same manner as tubercles, distributed in various organs in the same individual, I am not aware of any instance of the disease being propagated to the neighbouring glands by absorption, as we see in carcinoma.

In the six cases operated upon, incisions were made into the tumours some time prior to operation, and serous fluid tinged with the black deposit escaped. There was no bleeding, and no subsequent fungous protrusion such as occur in carcinoma. Further, melanosis, in as far as I have had an opportunity of learning, occurs only beyond the middle period of life.

Finally, the result of excision of the eyeball in cases of melanosis and medullary carcinoma, proves the dissimilarity of the two diseases. In all the cases in which the melanotic deposit was within the eyeball, so as to render its entire removal certain, a cure was effected; whereas in only one case of medullary carcinoma did success follow the operation. In unsuccessful cases of medullary carcinoma, large fungous growths, accompanied by severe pain, frequent bleedings, and profuse fetid discharge, followed; whereas in the case of melanosis, in which the success of the operation was doubtful, there was no protrusion, no hemorrhage, and the only local symptom which indicated that the disease might not have been eradicated, was a constant pain in the back part of the orbit, and a sanious discharge. From the hollow condition of the orbit, and contracted state of the eyelids, the surface of the cavity could not be well examined. The patient died from an apoplectic seizure eleven months after the operation. No post mortem examination took place. Even in this case it is doubtful whether the disease remained in the orbit after the operation. It was more likely to do so in this instance than in the others, as the melanotic matter was not limited to the interior of the eyeball, but occupied nearly the whole orbit, and consequently its entire excision could not with certainty be determined.

*Symptoms of Melanosis.*—This disease may commence either within the eyeball or in the orbit exterior to that organ. In neither case are marks of inflammation necessarily present. When it takes its origin within the sclerotic, vision is impaired and ultimately lost. In the early stages I am not aware of any means of diagnosis between this affection and amaurosis. The pupil in both is dilated, and presents the same horny, black colour; and the iris remains stationary under every change of light. But as the melanotic deposit increases in quantity, the iris and lens are pushed forwards towards the cornea, so as to diminish or altogether to obliterate the anterior chamber. At this

period the lens usually becomes opaque, but sometimes remains transparent, and the iris appears to be diminished in thickness, and perhaps altered in colour, and its pupillary margin is generally irregularly oval, the greater diameter being transverse. The patient now complains of an uneasy fulness in the eye, accompanied by occasional attacks of pain and throbbing, and tortuous vessels are seen on the conjunctiva. As the tumour increases in bulk these symptoms become more severe, until interstitial absorption of the sclerotic takes place, allowing of the projection of the mass beyond the natural limits of the eyeball, and thereby relieving this organ from distention. This absorption of the sclerotic usually occurs near the margin of the cornea, and between the tendons of the straight muscles where the sclerotic is thinnest and most readily yields. The projection is generally in the form of irregular nodules, as if constricted in certain points where some fibres of the sclerotic have not yielded to the same extent as others.

At this stage melanosis is very apt to be mistaken for dropsical effusion under the choroid, conjoined with amaurosis. In all the cases of this latter affection which I have seen, the iris was drawn behind the sclerotic in the direction of the protrusion, to such an extent in some instances as to be rendered invisible at that side of the eye—whereas I have not seen any such change occur in any case of melanosis. The probable cause of this difference in regard to the iris is, that when the melanotic matter is deposited between the sclerotic and choroid, no traction will be applied to the latter membrane, whereas in dropsy within the choroid, that membrane will be bulged outwards and subjected to traction, and will drag along with it the corresponding portion of the iris; for the adhesion of the iris to the choroid being much stronger than to the ciliary ligament, the latter connexion gives way. This condition of the iris will, I believe, prove a means of judging whether tumours or dropsies are internal or external to the choroid,—in the former the iris retaining its natural position, in the latter being drawn towards the protrusion. So similar are the appearances of melanosis and sub-choroid dropsy, owing to their sameness of colour, that in two instances of the latter disease I saved eyes which had been doomed to excision. Any doubt as to the true nature of the disease may at once be set at rest by puncture. If it be dropsy, a little fluid will escape, and the swelling immediately subside; if melanosis, a drop or two of black matter may ooze out, but with little or no change in the size of the projection.

After the tumour has passed through the unyielding sclerotic by the process of interstitial absorption, it pushes before it the conjunctiva, which, from its texture and loose connexions to subjacent parts, readily yields, and affords it a covering. When it projects much beyond the eyelids, the secretion of the conjunctiva hardens upon its surface, giving it a horny coating of a yellow colour. [See Figs. 1 and 2.]



I have had no opportunity of witnessing the progress of melanosis of the eye beyond this stage; but, judging from what takes place in other parts of the body, and the result of a case related by the late Allan Burns (as an instance of medullary tumour, for at that time the distinction between the two diseases was unknown), in which the disease returned after excision, we may conclude that additional melanotic matter would continue to be deposited, that the vigour of the constitution would give way, and the patient sink in a state of exhaustion.

When the disease commences in the orbit *exterior* to the eyeball, vision is not impaired at so early a period, nor indeed until the tumour has increased to such a bulk as to force the eyeball from its socket, and, by compressing and stretching the optic nerve, has deprived it of its sensibility.

The latter stages will necessarily be alike in both cases.

The following tabular view shows the age and sex of twenty-three patients operated on (the first six were under my care), and the result of the operations:—

*Cases of Melanosis operated on by Dr Robertson.*

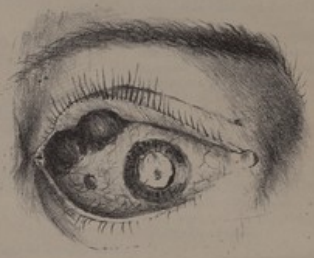
| Name. | Age. | Result. | Remarks. |
|---|---|---|---|
| 1. James Cowan, | 50, | Cured. | Died two years after operation from disease of heart—orbit healthy. |
| 2. Jane Murphy, | 51, | Cured. | No return of disease six months after operation. |
| 3. *Alex. Nicol, | 47, | Cured. | Died three years after operation from melanotic tumour, involving hip-joint, ilium, and sacrum—orbit healthy. |
| 4. *David Wilson, | 52, | Cured. | Is at present in good health, two years having elapsed since operation. There is a small melanotic deposit above cornea of other eye, which has now existed for nine years without change. |
| 5. *John Cross, | 49, | Doubtful. | Died, with symptoms of apoplexy, ten months after operation; discharge of fetid sanies from orbit for two months prior to death, but without any melanotic tinge, and no tumour. |
| 6. Mrs Kerr, | 55, | Cured. | Died two years after operation—orbit healthy—no melanotic deposit in any part of body. Liver enormously enlarged and of soft texture. |

* These three patients were from the same neighbourhood, the coast of Fife. David Wilson was operated on by my colleague Dr Duncan, during my absence from hospital duty.

*Cases from other Authorities.*

| Authors. | Age. | Sex. | Result. | Remarks. |
|---|---|---|---|---|
| 7. Allan Burns, Anatomy of Head and Neck. | 41 | female | died | Melanotic deposit (soft substance of an ink-colour) in antrum maxillare, orbit, liver, and above kidneys. |
| 8. Fawdington..... | 30 | male | died | Melanosis of cellular tissue of thorax and abdomen, liver, spleen, pancreas, kidneys, peritoneum, pleuræ, lungs, and head. |
| 9. Liston, 6th vol. Lond. Med. Gaz. | 52 | male | cured | |
| 10. Mackenzie, Diseases of Eye. | 40 | male | cured | |
| 11. Lawrence..... | 30 | male | cured | |
| 12. Carsewell & Cullen, Ed. Med. Chir. Trans. | 51 | male | died | Melanosis in cellular tissue, pleuræ, on diaphragm, in lungs, pericardium, heart, liver, spleen, kidneys, omentum, peritoneum, internal table of skull. |
| 13. Wardrop on Fungus Hæmat. p. 91. | 58 | female | cured | |
| 14. Dr Rosas, Vienna Hospital. | 50 | female | cured | |
| 15. Do..... | 73 | female | cured | |
| 16. Dr Holscher, Hanover, Oph. Obs. | 64 | male | cured | Died of exhaustion a year after operation. |
| 17. Dr A. Reuss, Prague, de Mel. Ocul. | 48 | female | cured | |
| 18. Zimmerman, Berlin. | 55 | male | cured | |
| 19. Dr Autenberger, Vienna, Ophthalmic Hospital. | | | cured | From numerical statement of cases treated in the Vienna Ophthalmic Hospital, age and sex not given. |
| 20. Do..... | | | cured | |
| 21. Do..... | | | cured | |
| 22. Do..... | | | cured | |
| 23. E. L. Birkett, Guy's Hospital Rep. Oct. 1844. | | male | cured | |

The above tables clearly show the difference which exists between melanosis and medullary carcinoma. In the vast majority of cases of medullary carcinoma within the orbit, the disease occurs in childhood; whereas there is not a single instance of melanosis under thirty years of age. It is doubtful if there be one well-authenticated case on record of medullary



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carcinoma within the eye cured by operation, whereas, of twenty-two patients affected with melanosis, no less than eighteen recovered after excision of the contents of the orbit, and in one it was doubtful whether or not there was any return of the disease. In the three patients who died, the melanotic matter was deposited in many different organs, chiefly in those of the thorax and abdomen. The conclusion appears to be inevitable, that melanosis cannot be classed as a species of carcinoma, or even as a malignant disease, in the usual acceptation of the term.

## EXPLANATION OF FIGURES.

Fig. 1. Drawing taken from the eye of James Cowan, æt. fifty, prior to operation. The melanotic tumour had penetrated the sclerotic coat near the margin of the cornea, and projected to the extent of about an inch, still covered by the conjunctiva. The secretion of the conjunctiva is hardened upon its surface (in consequence of the eyelids no longer covering the tumour), and gives to it the peculiar yellowish brown colour and horny hardness.

Fig. 2. Exhibits a section of fig. 1 after excision. The melanotic mass is situated between the sclerotic and choroid, and has pushed the retina, choroid, and lens towards the centre and anterior part of the globe. The melanotic cells, under the microscope, present a spherical shape, and are full of young. Many are of a tawny colour, others quite black. The microscopic appearances in the other cases were similar to the present.

Fig. 3. Section of eye of Mrs Kerr, æt. fifty-five, after excision. The melanotic matter is deposited in a mass between choroid and sclerotic. The internal structure is the same as that represented in fig. 2.

Fig. 4. Section of eye of John Cross, æt. forty-nine. From the history of this case it would appear that the tumour commenced within the eyeball, and gradually made its way through the coats of that organ; but instead of projecting forwards, as in fig. 1, the melanotic matter was deposited in the cellular substance of the orbit, so that it is seen divided by septa of that tissue into masses of variable size. The eye itself is completely filled with the black deposit, and the only part of that organ which can be traced is the sclerotic coat considerably shrunk. Before excision the tumour projected considerably beyond the orbit, and was of a nearly uniform brownish black colour, and still covered by the conjunctiva.

This patient died of apoplexy nineteen months after the operation. It is possible that the deposit of melanotic matter may have continued after the operation, and made an entrance within the calvarium, and thus have given rise indirectly to the sudden apoplectic attack, and therefore the result of this case is noted as doubtful. But this was by no means a probable occurrence, seeing that there was no obstacle to the deposit continuing to take place in its former seat after the removal of the contents of the orbit. It is much more likely that the apoplexy was produced by altogether different causes, or if by a melanotic deposit within the calvarium, that such was unconnected with the tumour in the orbit which was removed. Unfortunately no examination of the body after death was allowed.

Figs. 5 and 6. Drawing and section of eye removed from David Wilson, æt. fifty-two. In this case the humours of the eye have been pushed forwards, and have been converted into a mass of gritty earthy matter enclosed in a

firm fibrous capsule, occupying the place of the iris and anterior chamber. The melanotic matter is deposited in the posterior part of the eyeball, and in the cellular texture external to the sclerotic, and in that of the eyelid, the whole communicating through an opening in the sclerotic. In regard to this patient, Dr Cunningham of Kirkcaldy writes to me (12th Oct. 1844), "I visited David Wilson to-day, and found him in the enjoyment of excellent health; he has been engaged since January 1843 at his old employment, that of weaving, and says, he can do a good day's work yet. There is not the slightest appearance of any return of the disease in the left orbit, and in the right, where you may remember there were also appearances of melanosis, the disease appears to me to remain stationary. He has no pain, and has never lost a night's sleep since the healing of the sore caused by the operation."

This case is highly important in a practical point of view. We have melanotic matter deposited in both orbits. In the left it makes rapid progress, causing loss of sight, destruction of the eyeball, and much suffering accompanied by great constitutional disturbance and debility. In the right eye the disease remains stationary. Notwithstanding the existence of the disease in both orbits, we deemed it prudent to excise the contents of the left orbit, and the result has proved that our judgment of the case was correct, seeing that there has been no return of disease in the orbit operated upon, and that the melanotic deposit still remains perfectly quiescent in the right eye, now nearly nine years since its commencement, and that the patient has been restored to perfect health, and is "able to do a good day's work yet at his trade of weaving."

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# EXCISION OF THE EYEBALL IN CASES OF MELANOSIS, MEDULLARY CARCINOMA, AND CARCINOMA;

## WITH REMARKS.

BY J. ARGYLL ROBERTSON, M.D., F.R.S.E.

Lecturer on Surgery, &c. &c.

### CARCINOMA MEDULLARE.

This disease is known under various names, as Carcinoma Medullare, Spongoid Inflammation, Fungus Hæmatodes, Encephaloid Tumour, &c. It is of the consistence of brain, varying in colour from that of brain to a deep reddish brown hue, according to the degree of its vascularity, or to blood being effused into its substance by the giving way of some of its vessels, and the blood being more or less decomposed. It consists of meshes of delicate fibres, in which the medullary matter is deposited.

That this disease is essentially of the same nature as cancer there can be little doubt, seeing that portions of the same tumour sometimes vary in consistence from the hardest scirrhus to that of brain, and that soft medullary growths are often met with after the removal of hard scirrhous tumours.

The soft consistence seems to be dependent in a great measure on the medullary matter being deposited in loose delicate tissue.

In five of the cases operated on, this medullary mass was deposited within the choroid, and occupied the situation of the vitreous humour. In two cases it was situated exterior to the eyeball.

This disease may occur at any age; when it affects the eye it is commonly in early life. Mr Wardrop states that in twenty-four instances, twenty of the patients were under twelve years of age; and on four of the cases operated on by me, the patients were under eight years of age.

Although every species of carcinoma (with the exception perhaps of colloid, which has been seen in the adult only), may

occur at any age, still the different species are not equally common at all periods of life. When the morbid growth shows itself in infancy or youth, it commonly assumes the medullary form. In youth, also, the eye, the lymphatic system, and the brain, are the organs more liable to its attacks; whereas it is rarely seen till after the middle period of life in the uterus, mamma, stomach, intestines, &c. &c. Although the medullary carcinoma is even more disposed than scirrhus to implicate all surrounding parts in the disease, the skin seems to be an exception. In scirrhus the skin becomes adherent at an early period to the tumour, and takes on the cancerous ulceration; whereas in medullary carcinoma the tumour often attains an enormous size before the skin becomes adherent to it; and even after it has given way, it is not disposed to assume the characters of the cancerous ulcer, the subsequent changes which take place being in a great measure limited to the medullary tumour itself, the neighbouring skin remaining almost unaffected.

The following are the appearances which first call attention in cases of medullary carcinoma within the eyeball. The pupil is dilated and irregular in form. In all the cases which I have had an opportunity of examining, its transverse diameter was the larger. (Figs. 8 and 12.) The iris is changed in colour and texture, being usually of a reddish yellow hue, more especially towards the pupillary margin, and much reduced in thickness. In the fundus of the eye is discovered a peculiar glistening metallic appearance, like light reflected from a brazen mirror. On minute examination it is discovered that this peculiar metallic lustre is dependent on the reflection of light through the humours of the eye from the surface of a tumour deposited in the bottom of that organ, over which can sometimes be traced branches of the arteria centralis retinæ. In this condition the disease may remain stationary for months, or even for years.

The tumour at first enlarges slowly, afterwards its progress is more rapid. The vitreous humour is gradually absorbed to make room for its advancement. It then reaches the lens, which, with the iris, are pushed closely into contact with the cornea; the chambers of the aqueous humour being thus obliterated, and the lens usually rendered opaque, and concealing the tumour behind it. At this period the sclerotic assumes a bluish black tinge, which is owing to this membrane becoming thinner from absorption, and allowing the dark colour of the choroid to shine through it. The vessels of the conjunctiva are commonly enlarged and tortuous. It is said by many authors that in this disease the eyeball enlarges to two or three times its natural size. I have never witnessed this result. I think it probable that in most instances they have been deceived by an unnatural prominence being given to the eye by infiltration of the cellular tissue of the orbit projecting the eyeball forward, thus giving it



the appearance of being augmented in bulk. The sclerotic coat is by no means disposed to yield to distention, but readily gives way by absorption, as we daily see occurring in various dropsical affections of the eye.

The tumour now projects from the eyeball either through the sclerotic in the neighbourhood of the cornea, where it is thinnest and most readily yields to absorption, in which case it retains for a time a conjunctival covering, or the cornea inflames and sloughs or ulcerates, and thus affords room for the further increase of the diseased mass.

The tumour, now no longer confined by the membranes of the eye, enlarges rapidly, and projects from between the swollen eyelids upon the cheek. (Fig. 13.) In texture it is soft, spongy, and easily lacerated. Being supplied freely with blood-vessels, the coats of which are extremely delicate and readily ruptured, the tumour not only usually assumes a dark hue from blood effused into its texture, but profuse hemorrhage ensues from spontaneous rupture of these vessels, or on the application of the slightest mechanical irritation. Coagula of blood are often found in the interior of the mass. As the disease progresses, parts of the tumour slough, others ulcerate, and the patient sinks exhausted by suffering, discharge, and bleeding. Occasionally he is carried off by a sudden profuse hemorrhage. In some instances during the progress of the disease the absorbent glands over the parotid and those of the neck swell, and in them a similar medullary matter is deposited. Tumours of the same character are not unfrequently found in other parts of the body, more especially in the viscera of the abdomen and thorax.

An appearance in the eye dependent on a totally different cause, but resembling medullary carcinoma in its early stage, is occasionally met with. It is when either pure blood or fibrine is effused from the arteria centralis retinæ into the cells of the hyaloid membrane. When blood is effused, it presents at first, when viewed in a clear light, a bright scarlet hue; but in proportion as the colouring matter of the blood is absorbed, it exhibits the peculiar metallic glistening appearance which is seen in the malignant disease. This effusion of blood into the vitreous humour may occur spontaneously, or be the result of external injury. The red colour presented in the early stage, and the sudden occurrence of the affection, will point out the difference between it and the malignant tumour.

It is more difficult to form a diagnosis between cases of effusion of fibrine into the hyaloid membrane, and the malignant tumour. In the instances of effusion of fibrine which I have witnessed, the metallic lustre, which must arise from the presence of an opaque reflecting substance deeply seated in the eye, was not so clearly marked as in the malignant disease, probably owing to the effusion being in the substance of and not posterior to the vitreous

humour; for it is found that, in proportion as the opaque reflecting body advances towards the cornea, it loses its metallic lustre. I have observed also, that, in the non-malignant affection, although the pupil was dilated, it was regular in form, and the texture and colour of the iris were not altered. In some instances, also, vision was not entirely lost, whereas, in malignant diseases, total blindness, I believe, always exists. I am at present attending a lady, twenty-six years of age, whose eye presents the lustrous metallic appearance. It is dependent on effusion of blood into the hyaloid membrane, which apparently was caused by a sudden fright. Instantaneous blindness of the affected eye followed. The effusion is gradually being absorbed, and she can now distinguish large objects. The pupil is fully but equally dilated, and there is no change in the colour or texture of the iris. The sclerotic retains its natural appearance, and no enlarged or tortuous vessels are seen on the conjunctiva. The importance of a correct diagnosis in such cases is sufficiently evident.

The operations which have been performed for the cure of the medullary carcinoma in the eye have almost, without exception, proved unsuccessful, the disease returning within the period of two years from the date of the operation. So great, indeed, has been the want of success, that it may almost be a question in how far we are justified in continuing to operate in this disease. In one case out of the five of excision for the cure of medullary carcinoma situated *within* the eyeball, the disease did not reappear. The patient, John Graham, fifty-six years of age (Fig. 16), in passing through a wood in the dark, received a severe blow in the right eye by running against a decayed branch of a tree. The blow was so severe that he fell to the ground insensible. He speedily recovered from this state, but vision was entirely lost in that eye, and has continued so ever since the accident. The inflammation which followed yielded to leeching and warm fomentations, and the eye recovered its original appearance, with the exception of a dilated state of the pupil. The accident occurred in the autumn of 1818; in the month of June 1824 he began to suffer from a feeling of fulness and distention of the eyeball, and an occasional throbbing pain in the temple and forehead. In August it was first observed that the pupil had assumed a yellowish metallic colour. In October the eyeball began to project from its socket. In January 1825 he placed himself under my care. On examining the eye the cornea was opaque, and the vessels of the conjunctiva enlarged and tortuous. The form of the eyeball was irregular, and the cornea much more conical than natural. On its centre was a deep ragged ulcer passing through all its laminæ, and the bottom of the ulcer was occupied by a soft pultaceous mass, through which the probe passed readily into the interior of the eyeball. His health was failing from constant suffering and



loss of appetite and sleep. The pain he described as occasionally of a burning, at other times of an excruciating lancinating character, extending to the temple and forehead, and sometimes to the occiput. On the 18th January 1825, I removed the contents of the orbit. On introducing my finger after the excision of the eyeball, to ascertain the condition of the parts, I found that the greater part of the orbital plate of the frontal bone had been absorbed, so that the finger lay in contact with the membranes of the brain,—a state showing the necessity of extreme caution in the use of the knife in cases of long standing and accompanied by much enlargement of the contents of the orbit. That the bone had not participated in the malignant disease, but that it had been removed by simple absorption, is sufficiently demonstrated by the favourable result of the case, and by all the parts removed exterior to the sclerotic being free from the disease.

This patient made a rapid recovery, without a single untoward symptom. In 1836, eleven years after the operation, he was in good health, since which time I have not heard of him. On making a section of the eyeball the following appearances presented themselves (Fig. 15):—

The whole of the eyeball was filled by a soft mass lying within the choroid; it was of an opaque white colour, and when submitted to the microscope presented all the characters of the carcinoma fasciculatum. There was no trace of the lens; the cornea was ulcerated at its centre, through which ulcer the tumour slightly protruded.

In all the other cases, as I have stated, the disease returned in the orbit, and in all presented the same appearances; the socket becoming filled by a soft medullary mass, accompanied by fetid discharge and more or less bleeding. Elizabeth Williamson died three months after the operation; Jane Macpherson lived five months; PeterJohnston, eleven months; and John Richardson, eight months.

### SCIRRHUS.

*Scirrhus* is described by most authors on ophthalmology as in many instances originating in the eyeball itself, commencing with severe pain in the eye and head, followed by dimness of sight, and at last total blindness, the eyeball becoming indurated and misshapen, the sclerotic of a dirty yellow colour and irregularly prominent, and the superficial vessels enlarged and varicose. That the disease subsequently extends to the surrounding parts, the conjunctiva ulcerates, and the ulceration passes from one tissue to another. That on making a section of the eyeball after its removal, the sclerotic is found thickened, cartilaginous, and intersected with white bands, and the place of the vitreous humour occupied by a mass of a somewhat less firm consistence, and divided by similar membranous septa.

I have never met with this form of disease either in my own practice or in that of others. Indeed, I am disposed to think that the ordinary form of scirrhus is seen only in the lachrymal gland, cellular tissue, conjunctiva, and integuments of the eyelids. That the sclerotic not only does not give origin to scirrhus, but is remarkable for resisting cancerous infiltration from neighbouring parts, as is shown in cases in which carcinoma exists on each side of that membrane, it remaining untouched. We even find the sclerotic divided into two laminæ by carcinomatous matter, these laminæ remaining unaffected by the disease. When the carcinomatous deposit occurs in the interior of the eyeball, it is invariably of a soft medullary consistence.

Although in most instances of carcinoma there exists a constitutional disposition to the affection, yet there can be as little doubt that in many cases the disease is entirely local in its origin, and that the general system only subsequently becomes contaminated if it be allowed to proceed. This more particularly holds good in regard to the skin. Hence the numerous cases of perfect cure effected in carcinoma of the lip, when excision is had recourse to in an early stage. I believe that the operations for the cure of cancer of the eyelids would be equally successful with those performed on the lip, were they resorted to sufficiently early, and less care taken to save the surrounding parts to avoid the subsequent disfiguration. Much difficulty, however, is necessarily experienced in gaining the consent of the patient to a comparatively formidable operation for the cure of an apparently trivial disease.

The probability of success in operating will be greatest where no firm connexion has been formed between the diseased parts and the subjacent bone, where the constitution of the patient is otherwise good, and where the operator uses his knife with sufficient freedom. Again, where there is a strong constitutional disposition to the disease, often indicated by the appearance of the patient, when the disease commences without the application of any external cause, and where the surrounding tissues are adherent to the diseased part, the chances of success will necessarily be much lessened.

Scirrhus, in so far as I have had an opportunity of witnessing the disease, most frequently commences in the lower eyelid, at its margin, and generally near the external canthus. Why the lower eyelid and lower lip are more subject to scirrhus than the upper eyelid and upper lip, seeing they are so similar in structure and function, it is impossible for us in the present state of our knowledge to determine.

Scirrhus commonly first shows itself on the eyelid in the form of an indurated warty-looking excrescence, at other times in the form of a hard indurated swelling, of small size, usually of a dusky reddish brown hue, and resting on a broad firm basis;



and in either of these conditions the disease, if not irritated, may remain for years. When irritated by being rubbed or scratched by the patient, or by the stimulating applications or the lancet of the surgeon, their progress becomes more rapid. They increase in bulk, a thin discharge takes place, which dries into a scab, under which ulceration proceeds, the scab falling off from time to time and being again renewed. The ulcer gradually enlarges, and the edges are usually elevated, hard, and jagged. Often there is a sensation of burning heat, and occasionally, though rarely, of lancinating pain. The indurated base extends in all directions, to which the ulceration slowly spreads. The discharge may be thin and offensive, or of a healthy purulent character, and occasionally tinged with blood. The eyelid is now found to be firmly attached to the subjacent periosteum and bone, and the diseased structure extends much beyond what is apparent to the eye. At this period it is said that large fungous excrescences, with profuse discharge and hemorrhage, occur. These I have not witnessed. We sometimes see a temporary cicatrization, but it does not present a healthy natural appearance, soon gives way, and the ulceration again proceeds in its course. The ulceration extends to the conjunctiva, which becomes firmly attached to the subjacent sclerotic; the cornea now inflames and ulcerates, the humours of the eye are discharged, and the globe now sinks in the socket, which presents a cavity overspread by the cancerous ulceration, the sclerotic coat generally remaining to the last (Fig. 20). The glands over the parotid and under the jaw seldom swell or take on the same malignant action. The discharge increases in quantity, at last the patient sinks exhausted, and often in a comatose state. Generally, but by no means invariably, the sufferings of the patient during the course of the disease are comparatively trifling. The progress of the ulcer is usually very slow, sometimes being of small extent even at the expiry of ten, fifteen, or twenty years from its commencement. In other cases it is more rapid, and makes extensive ravages, destroying all the soft parts within the orbit, and those of the cheeks and nose, and even communicating with the cavity of the mouth, presenting a most hideous aspect. (See Fig. 20.) Scirrhus in this situation, as has been justly remarked by Dr Jacob in his excellent essay (Dublin Hosp. Reports, vol. iv.), is seldom attended by lancinating pain, fungous growths, sloughs, hemorrhage, fetor, or swelling of the lymphatics.

In the treatment of this affection all local and constitutional remedies have failed in eradicating the disease, although many are useful as palliatives. I have not used escharotics or the cautery, believing them to cause infinitely more suffering to the patient and to be much less effectual than the knife. It will be seen by the tabular view, that I have operated in five cases of

carcinomatous affections of the orbital appendages. The three first presented the characters I have just described; in two of these a cure was effected, and in one the scirrhus returned.

In the first of these cases—that of James Grant, æt. sixty—the disease commenced twelve years previously, in the form of a small warty excrescence. Every kind of treatment, local and constitutional, had been tried in vain. At the period of operation there was an ulcer towards the external canthus occupying about one-third of the lower lid; at that part the tarsal cartilage had been destroyed, leaving a deep hollow through which the tears flowed and excoriated the cheek. The ulceration had extended to that part of the conjunctiva which covers the sclerotic, and almost reached the cornea. When he attempted to move the eye it had a peculiar almost rotatory motion, being bound down at the seat of the ulcer. In the early period of the disease little pain was experienced, but during the last three months his sufferings were from time to time very severe, owing to attacks of inflammation of the whole globe. The cornea was so opaque that the condition of the internal structure of the eye could not be ascertained. In compliance with the urgent request of the patient, I removed the eyeball and lower lid, carrying the incision some way down the cheek, so as to remove if possible all contaminated parts; and I scraped the periosteum from the bone at that part of the margin of the orbit seated beneath the ulcer. This patient made a perfect recovery. He visited me in perfect health four years after the operation was performed.

In the second case—John Williamson, æt. sixty-two—the disease was of four years' standing, and limited to the external half of the lower lid. The conjunctiva and globe were healthy. The eyelid at the seat of ulceration was firmly connected with the subjacent bone. I removed more than two-thirds of the eyelid and the periosteum, where it seemed to be connected with the disease. The parts assumed a healthy look, and granulation proceeded favourably during the first month; it then gradually resumed the cancerous character, and the patient refused to submit to further treatment.

In the third case—William Ross, æt. fifty—the disease was of three years' standing; the ulcer occupied about one-third of the eyelid, and was not attached to the bone. I excised about one-half of the eyelid, and the case proceeded favourably, and there has been no return of the disease.

The three following cases differ from each other and from the preceding in many important points:—

Mrs Walker, æt. sixty-two (Figs. 14 and 15), states that the left eye has been in a weak state since childhood, and that it has been the subject of repeated attacks of inflammation, but which always yielded to the usual remedies. About two years



ago she began to suffer from severe lancinating pains passing from the eye to the temple and occiput, and which have continued ever since. After the last attack of inflammation, about three years ago, a fleshy elevated ring formed round the cornea, and which remained stationary for about a year and a half; it then began slowly to enlarge, and has continued to advance in spite of leeches, blisters, mercurials, and every kind of lotion. The swelling appears to have proceeded from the margin of the cornea backwards, gradually projecting the eye from the socket. The transparency of the cornea and the functions of the retina remained unimpaired until about three months ago, when vision failed, the cornea becoming opaque, probably in consequence of the inflammation caused by the constant exposure of the eye to the air and light, the eyelids being no longer capable of closing over the eyeball, owing to its bulk, and the extent to which it was thrust forward. Her health and strength have latterly been failing under constant pain and want of sleep. After excision of the contents of the orbit she made a rapid recovery. She died from general decay, without any marked disease, twelve years after the performance of the operation.

Fig. 14 represents the appearance of the eye three months prior to the operation. The swelling continued to enlarge, and the eyeball to be farther projected from the socket. On making a transverse section of the eyeball after excision, its membranes and their contents were found perfectly healthy (Fig. 15). Exterior to the sclerotic, and under the conjunctiva, it was surrounded by a dense mass of medullary sarcoma, which, when subjected to the microscope, presented spherical cells.

Grizzel Syme, æt. fifty, states that twenty-two years ago a tumour about the size of a chestnut was removed from the orbit, under the frontal ridge, by Sir William Newbigging, and that in three weeks the wound was healed, the eye had regained its natural appearance, and the sight was good. About two years ago she observed the eye beginning to protrude, which protrusion has continued steadily to increase, the eyeball being forced downwards and outwards. Vision is very slightly impaired. She experiences little pain in the orbit, but is subject to frequent headaches. At the upper and inner part of the orbit, extending behind the eyeball, is felt part of the tumour, of firm consistence, and very slightly moveable. In consultation with my colleagues at the Hospital it was deemed expedient that the tumour should be excised.

An incision was made from the outer canthus vertically upwards to the extent of about an inch, so as to liberate the upper eyelid, which was then dissected backwards. The tumour was found to pass to the bottom of the socket and under the optic nerve, with firm attachments to the eyeball, nerve, and periosteum, so that it became indispensable to remove the whole con-

tents of the orbit. The tumour was about the size of a pigeon's egg. During the first four days after the operation she continued pretty well, with the exception of headache and occasional restlessness—the pulse about 90, and of moderate strength. On the evening of the fourth day the headache and restlessness increased, and she became delirious. Symptoms of opisthotonos, though not very strongly marked, supervened. On the fifth day she was almost insensible; there was constant subsultus tendinum, the pulse 120, weak and intermittent, and the extremities cold. She gradually passed into a state of complete coma, and expired.

*Sectio cadaveris.*—Old adhesions existed between dura mater and anterior part of frontal bone. The surface of the arachnoid was covered with purulent matter; the vessels of the anterior part of the arachnoid membrane injected. Purulent matter was also found in the sub-arachnoid cellular tissue, at the posterior part of the vermiform process, and on the upper surface of the right orbital plate of the frontal bone, which bone was translucent, and not thicker than writing-paper. The substance of the brain was healthy. On making a section of the tumour it was found to be somewhat fibrous in its texture, and to present the characters of the carcinoma fasciculatum (Fig. 18).

The tumour removed from this patient twenty-two years prior to the second operation appears to have been of a simple fibrous structure; and it is not improbable that the basis of the second tumour was of the same nature, but that, occurring at a later period of life, and the system in a condition disposed to carcinomatous deposits, it presented the fibrous structure, and the characters of the carcinoma fasciculatum (Fig. 17).

This case exemplifies also the fact that the optic nerve bears a considerable degree of extension and twisting without disturbance of its functions, the eyeball having not only been protruded forwards and downwards, but turned considerably outwards from the proper axis, and the powers of vision remaining entire.

This case also shows the insidious manner in which inflammation of the brain or its membranes may creep on. The inflammation does not appear to have extended from the orbit along the course of the optic nerve, as the membranes investing it presented a perfectly healthy and natural appearance. It is the only case in my practice in which the operation appears to have been the cause of the fatal result. The existence of old adhesions between the dura mater and anterior part of the frontal bone, shows that the patient had previously suffered under inflammatory affections of these parts, which would give rise to a greater liability to their recurrence on the application of an exciting cause.

Robert Wilson, æt. sixty. In 1837 this patient received a severe blow on the eye from the fist of his antagonist in a scuffle. The inflammation which followed required general and local depletion. In June 1838, three benign polypi were removed from the nostril next the affected eyeball by Dr Skae of Leven. The eye, at that time, presented the appearance of being slightly protruded. The orbital contents continued to augment in bulk, accompanied by considerable pain. In October of the same year he placed himself under my care. Nearly one-half of the eye was projected beyond the socket by a tumour of soft consistence attached deep in the socket. The conjunctiva was of a uniform red colour. The cornea was transparent, and the contents of the eyeball in their natural condition, but the power of vision was lost. He complained of constant uneasiness in the part, and of frequent lancinating pains. His sleep was restless, appetite impaired, and he had been rapidly losing flesh and strength. His countenance presented an anxious expression, and the skin that peculiar leaden yellow hue so frequently seen in patients labouring under carcinomatous disease. I excised the contents of the orbit, and the patient made a good recovery, and returned to Fife.



In the following summer (1839), there was an offensive sanious discharge, in considerable quantity, with constant pain in the back part of the orbit, great emaciation, quick small pulse, and much general debility. The eyelids were so contracted and puckered round the orbit, and the attempt to separate them gave so much suffering, that the bottom of the cavity could not be examined. On the 9th of August he had an apoplectic seizure, from which he recovered; but on the 25th of the same month he became comatose, and died on the 31st.

On examining the parts after operation (Fig. 17), a tumour one-half larger than the eyeball was found adhering loosely to that organ by fine areolar texture. At one spot opposite the annular ligament, it was attached to the sclerotic somewhat more firmly than elsewhere, but it had no intimate connexion with that membrane. The mass resembled medullary sarcoma in its lobulated configuration. In its intimate structure, especially externally, it approaches carcinoma alveolare; in other parts, carcinoma simplex.

From what has been stated it will appear that melanosis ought not to be classed as a species of carcinoma, or even as a malignant affection, and that when so situated that the whole mass may be removed by the knife, it is a curable disease.

That scirrhus of the eyelids is, like the same disease occurring in the lip, curable by the knife, provided all the parts involved be removed.

Of the other species of carcinoma seven cases are related. In two of these the operation of excision was successful; the

one presenting the characters of carcinoma fasciculatum, and situated within the eyeball, the other of medullary sarcoma with spherical cells, situated between the sclerotic and conjunctiva,—the one patient being fifty-six, the other sixty years of age.

The operations for the cure of such cases have been so universally unsuccessful that I would have been disposed to think that I had been deceived as to the true character of the affection in these two instances of a successful result, were it not that the diseased structures were minutely examined by so distinguished a pathologist and careful observer as Mr Goodsir, and that the cases differed from almost all those on record, in occurring in individuals somewhat advanced in life, instead of in infancy. Is it possible that when carcinoma shows itself at an early period of life, it indicates in a higher degree a constitutional taint and less of a local origin?

I must, in conclusion, express my deep obligations to my friend Mr John Goodsir, the distinguished conservator of the University Museum, for examining and submitting to the microscope the various preparations, and to my talented colleague Dr Skae, lecturer on anatomy, for the beautiful plates by which the subject is illustrated.

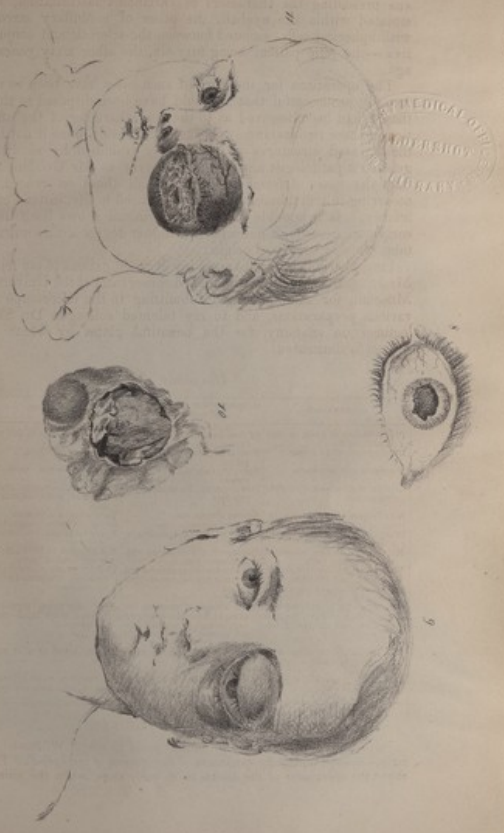
*Diagnosis.*

| ENCEPHALOID. | SCIRRHUS (as in common cancer of mammæ.) | MELANOSIS. |
|---|---|---|
| Of consistence of brain in thin cellular septa. | Of firm consistence in cellulo-fibrous septa. | Of soft consistence in thin cellular septa. |
| Of an opaque white colour. | Semi-transparent bluish yellow colour. | Black or sepia colour. |
| Numerous minute vessels. | Sparingly supplied with blood-vessels. | No blood-vessels have been traced. |
| Consists of globules and caudate corpuscules. | Nuclear cells. No caudate corpuscules. | Pigment cells—round, oval, or irregular, and sometimes caudate. |
| May become of enormous bulk. | Seldom of large size. | They attain a large size. |
| Often of rapid growth. | Progress generally slow. | Growth of variable rapidity. |
| Often interstitial effusion of blood. | Rarely interstitial hemorrhage. | Never interstitial hemorrhage. |
| Not disposed to form adhesions to surrounding parts. | Becomes firmly connected with surrounding parts. | Not disposed to form adhesions to surrounding parts. |
| When subcutaneous, the skin is distended and stretched, and gives way usually by simple ulceration. | The skin becomes puckered and assumes the cancerous ulceration. | The skin becomes stretched and distended, and yields by simple ulceration. |
| After ulceration, rapid progress, and often large fungous growths, and frequently hemorrhage. | After ulceration progress not so rapid, and seldom profuse hemorrhage, provided it does not assume the encephaloid structure. | After ulceration progress of tumour more rapid—no hemorrhage. |
| This species of carcinoma most frequently met with in infancy and youth. | Most common in advanced life. | Usually about or after middle age. |
| Liable to be propagated through the absorbent organs. | Even more liable to be propagated through the absorbent organs. | No tendency to be propagated through the absorbent organs. |

## EXPLANATION OF FIGURES.

Figs. 8, 9, 10, and 11, all refer to the case of Elizabeth Williamson, æt. eight,—disease, medullary carcinoma in the interior of the eyeball. Fig. 8 shows the appearance of the disease in its early stage, when the humours





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Dr Shaw fecit. Printed by Pr. Schmidt.

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Dr Macknight. B. by F. Edwards.

PL. VIII.

PL. IX.

Dr. Skae fec.t

of the eye are still transparent, and when the peculiar metallic glistening is seen deeply seated in the eye. The iris also is irregular in form and immoveable. At this period I proposed operating, but the parents refused their consent.

Fig. 9. This drawing was taken three months after the former, and the day prior to the excision of the eyeball. The cornea is now somewhat opaque, the lens and iris pushed closely into contact with its internal surface, the vessels of the conjunctiva and sclerotic injected, the eyeball partially protruded, and considerable œdema of the eyelids.

Fig. 10 shows a section of the eyeball. The greater part of the posterior chamber is occupied by a tumour presenting all the characters of medullary carcinoma, supplied with numerous small vessels, and having spherical cells.

Fig. 11 shows the appearance presented three months after the operation, and a few days before the death of the patient. During the first fortnight after the operation all appeared to be going on favourably. The granulations then became pale-coloured, loose, and flabby ; a fetid thin discharge took place, occasionally tinged with blood. The socket was gradually filled up by a fungoid mass of soft consistence and very vascular ; the discharge augmented in quantity, the bleedings became more frequent, and the child sunk exhausted.

Figs. 12 and 13. Fig. 12 shows appearances similar to Fig. 8, viz., those which characterize the early stage of medullary carcinoma within the eyeball. No operation was performed. The patient was again brought to me after the lapse of two years, with an enormous tumour of soft consistence projecting from the orbit (Fig. 13). The discharge was small in quantity, very rarely tinged with blood, and he suffered little pain. His general health, however, was rapidly failing. I learned that the eye had given way about six months previously, and that the tumour had gradually attained its present bulk. The patient died exhausted about two months after the drawing was taken.

Figs. 14 and 15 refer to the case of Mrs Walker, æt. sixty-two, whose case has already been detailed. It will be perceived that the entire mass is altogether external to the eyeball. It consists of medullary carcinoma, with spherical cells. This patient recovered.

Fig. 16 shows the section of the eyeball, after excision, of John Graham, æt. fifty-six, whose case is already related. The mass occupies the cavity of the eyeball, and projects through the cornea. When submitted to the microscope, it shows all the characters of carcinoma fasciculatum, presenting neither cellular globules nor caudate corpuscules, but consisting of tufts of fibres running in a divergent course. This patient also recovered.

Fig. 17. Section of eyeball of Robert Wilson, æt. sixty, whose case has also already been detailed. The tumour adheres loosely by fine areolar texture to the external surface of the sclerotic. Its texture is somewhat anomalous. It resembles medullary sarcoma in its lobulated configuration, but not in its intimate structure, which in some places, especially externally, approaches carcinoma alveolare, in other scarcinoma simplex.

Fig. 18. Grizzel Syme, æt. sixty. Her case has already been related. The tumour is attached loosely to the external surface of the sclerotic by fine areolar tissue. The texture is somewhat fibrous, but not a pure fibrous tumour, probably a form of carcinoma fasciculatum.

Fig. 19 shows the appearance of medullary carcinoma involving the orbit, frontal sinuses, antrum maxillare, and the cavity of the nose.

Fig. 20 shows the most advanced stage of carcinoma commencing in the eyelid. The disease commenced in the form of a small warty excrescence on the lower eyelid twenty-two years ago. The patient died exhausted. The only period at which his sufferings were acute was when the disease extended to the eyeballs, and before these organs had given way and allowed of the escape of their contents. The sclerotic coats could be distinctly traced at the period of his death, showing how little this structure is disposed to assume the cancerous degeneration.

58, Queen Street, Edinburgh,
15*th October* 1844.

18.

# OPERATION

FOR THE

# CURE OF SQUINTING:

ILLUSTRATED BY EXPLANATORY PLATES, THE DRAWINGS AFTER NATURE:

BEING

# AN APPENDIX

TO A

# SYSTEM OF PRACTICAL SURGERY.

BY

JOHN LIZARS,

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EDINBURGH:

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MDCCCXL.

# OPERATION

FOR THE

# CURE OF SQUINTING.

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This operation has all at once become so common, and the modes of performing it, with their consequences, so various, that it is a duty incumbent on me to treat of it now; for it was altogether unknown in this country, when Part II. of my Practical Surgery went to press. We are indebted to Mr Lucas of London, for its introduction into Britain,—to Dr Dieffenbach of Berlin, for its discovery.

The operation is chiefly had recourse to in strabismus convergens, and hence I have only illustrated this; for any operator can easily transfer the principle to strabismus divergens.—Before proceeding to operate, the Surgeon should investigate the case, otherwise he may fail; besides, cases present themselves curable by milder means. The instances most favourable for operation, are those in which squinting has begun in early life, and where no inflammation exists; also where but one eye is affected, as represented in Plate II. fig. 1. When both eyes are the seat of this affection, we ought to operate on both at the same sitting, in order that, by liberating both eyes, we may render the axis of vision the same in both; also, that the unoperated eye may not, by its accustomed sympathy,

drag the operated one back to its abnormal state. In operating on both eyes, however, at once, we must be careful to leave a fibre of the adductor muscle of the less faulty eye, or the fibro-cellular tissue on each side of this muscle, in order to antagonize the abductors, and prevent eversion of both eyes. Where the one is more faulty than the other, we may operate upon the more faulty first, in the hope that the other may rectify itself in a week or two.

In convergent strabismus, we divide the internal rectus muscle or adductor oculi; in the divergent, the external rectus muscle or abductor oculi. In those instances where the eye is very much turned inwards, and the individual cannot turn it outwards, it is proposed to divide, not only the internal rectus, but some of the contiguous fibres of the rectus inferior or depressor oculi; but this has been found only necessary in inveterate strabismus of one eye, for where both organs are affected, the division of the internal rectus in each eye completely liberates both, whereas the division of any of the fibres of the depressor makes the eye start forwards. In one instance, I observe, that not only the adductor and inner fibres of the depressor, but that the inferior oblique muscle was also divided.

The instruments which I consider best adapted for the operation in convergent squinting, are delineated in Plate I. The probe-pointed bistoury, marked *i*, I have now laid aside, because it is not so manageable as the curved scissors *e*, and causes a little delay from the change of instruments. It may, however, be occasionally required, after the scissors have cut across the tendon, to divide any contracted fibro-cellular tissue still confining the eye.

The instruments are arranged in the order in which they are to be used; they should be placed on a small tray within reach of the operator, and on which also should be put a cupful of warm water, with a small piece of sponge fixed to the end of a probe.

The letter *a*, indicates a pair of toothed artery forceps. *b*, a speculum. *c*, is a small double hook, a trifle larger than that marked *f*. *d*, another pair of toothed forceps. *e*, a pair of curved scissors, such as are used in the ordinary case of eye



instruments. *f*, a smaller double hook than that represented by the letter *c*. *g*, a hook for raising the tendon of the muscle. *i*, a small probe-pointed bistoury, which may be required after the employment of the scissors.

The patient, having taken a gentle dose of physic the day previous, should be placed on a table covered with a blanket, the head resting on a thin pillow, so as to have the eye as nearly horizontal as possible. Some direct the patient to be placed on a chair, with the head resting on the breast of an assistant; and some, that the chair ought to slope back like that of the Dentist; but, as in the operation of extraction of the lens, the horizontal is greatly preferable to the perpendicular position, and the more especially in this operation, where it often happens that the patient is a restless child. I have been told, that some farcical exhibitions have taken place, where the patients were seated on chairs.

As represented in Plate II. fig. 1., I have selected the right eye affected with strabismus, being the most frequent seat of this deformity; therefore the reader will bear in mind, that the right is the eye spoken of throughout the description. To the left eye a compress of lint is to be applied, and over it a silk handkerchief; the shutting of this eye from the light enables the patient to look more correctly with the affected eye, unless the inversion be very inveterate. The operator now grasps, with the forefinger and thumb of the left hand, the eye-lashes of the lower eyelid, gently everts it, and seizes hold of the tunica conjunctiva investing it, with the artery-forceps *a*, which he gives to an assistant to support, as depicted in Plate II. fig. 2., that they may not drag the eyelid too much down. He next raises the upper eyelid with the speculum *b*, (fig. 2. Plate II.) which he gives to another assistant, whom he ought to select as his chief *aide-de-camp*.

The eyelids being thus fixed or held apart, he requests the individual to look outwards as much as possible, during which the assistant, who is supporting the forceps, should observe that the left eye be completely closed; he then plants the double hook *c* on the conjunctiva, close to the circle of the cornea, gently pulls the eye outwards, and hands the instrument to his chief assistant, who should take care that it run

parallel with the area of the face, and do not press on the eyeball. See Plate II. fig. 2.

The operator, as represented in Plate III. fig. 1., now pinches up, with the artery-forceps *d*, the tunica conjunctiva *k*, between the cornea, or rather the hook *c*, and the plica semilunaris, and clips away, with the curved scissors *e*, an oblong or ovoid portion of this membrane. A surface (*r*, fig. 2. Plate III.) is now exposed, which enables the operator to see the insertion of the tendon *m* of the internal rectus muscle, but there are generally required here the use of a bit of sponge to wipe away a little blood, and some scraping with the convex side of the scissors *e*, or the hook *g*; for the tendon *m* should be distinctly seen before the hook *g* be passed, which is to be carried from below upwards, until its point *n* appear beyond the upper margin of the tendon *m*. One limb, *o*, of the curved scissors *e* is then passed under the tendon *m*, and this cut across, so that the hook be liberated; unless this be attended to, a few fibres of the tendon may escape division, and render the operation abortive, so that it may require repetition. When passing the hook under the tendon, the operator must be careful not to be deceived, by raising tough cellular or fibro-cellular fibres, instead of the tendon. The tendon is strong, striated, of a pearly colour, and cuts toughly or gratingly. It appears much stronger and broader in the living than in the dead eye.

Whenever the tendon of the muscle is divided, the left eye should be uncovered, and the patient requested to look straight forwards; if both eyes correspond, and the muscles of the eye operated on, are unable to roll it horizontally inwards; if, in fine, the pupil turns downwards and inwards from the action of the depressor, it is presumable that the tendon has been completely divided. But if the right eye do not look straight forwards, the left should be again closed, the eyelids held apart with the fingers of the assistant, as represented in Plate VII. fig. 9, of Part II., the surface *r* sponged, the hook *g* used, in order that we may ascertain whether any fibres of the tendon *m* have been left undivided, and if so, let them be freely cut through, either with the scissors *e*, or probe-pointed bistoury *i*. If no fibres remain undivided, it is to be inferred,



that the inversion of the eye-ball is consequent on contraction of the contiguous fibro-cellular tissue, which must be in like manner cut through.

In figure 2, of Plate III., two hooks are represented, marked *c*, and *f*; the former *c*, is implanted in the conjunctiva as already described; the latter *f* is implanted in the sclerotic coat, close to the hook *c*, to assist in everting and keeping steady the eye-ball, and these should be used in every inveterate case, immediately after the operator has snipped away the ovoid portion of the conjunctiva, as represented in fig. 1. of the same Plate. Both these hooks are held by the chief assistant. The hook *f*, is a little smaller than the hook *c*.

It has been already observed, that in certain cases, it is found necessary, not only to divide the tendon of the adductor muscle, but also a fibre or two of the depressor oculi. This is to be done, by clipping away a little more of the conjunctiva at the point of the insertion of the depressor, so as to bring into view its tendinous insertion, then by inserting the hook *g* from above, downwards under the inner margin of the tendon, and by clipping with the curved scissors one or more fibres.

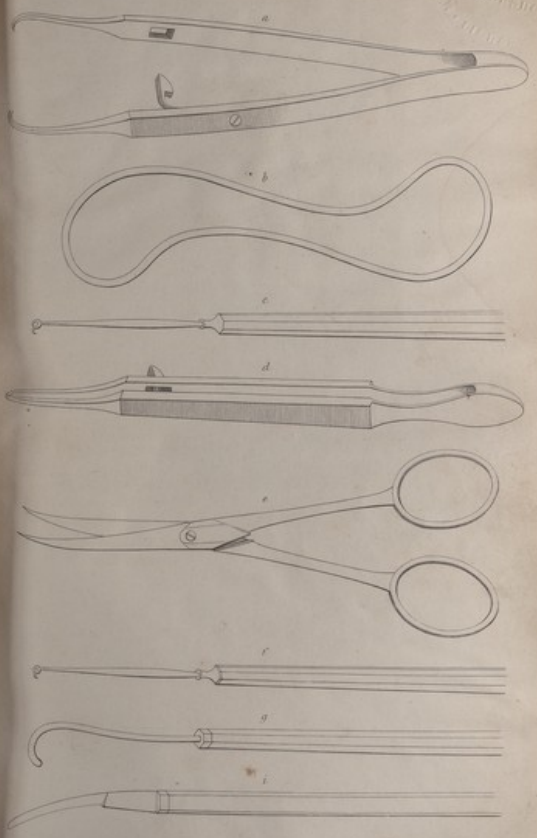
After the operation, let a compress of lint, dipt in warm water, be applied over the eye which is to be kept shut; the patient is to be put to bed for the rest of the day, and confined in a darkened apartment. The eye may be bathed with warm water the following day, and on the third day with cold water. On the fourth, if there be no irritation remaining, which is generally the case, he may be allowed to walk about. If an operative, he may resume his occupations.

Fig. 3. of Plate III. illustrates the eye cured of squinting.

The Profession in Edinburgh is very much obliged to Mr Simpson, Cutler, College Street, for having so early brought from London the elegant little instruments used in this operation.

H. & J. Pillans, Printers, Edinburgh.

PLATE I.




Drummond pinx.

Fig 1 PLATE II.

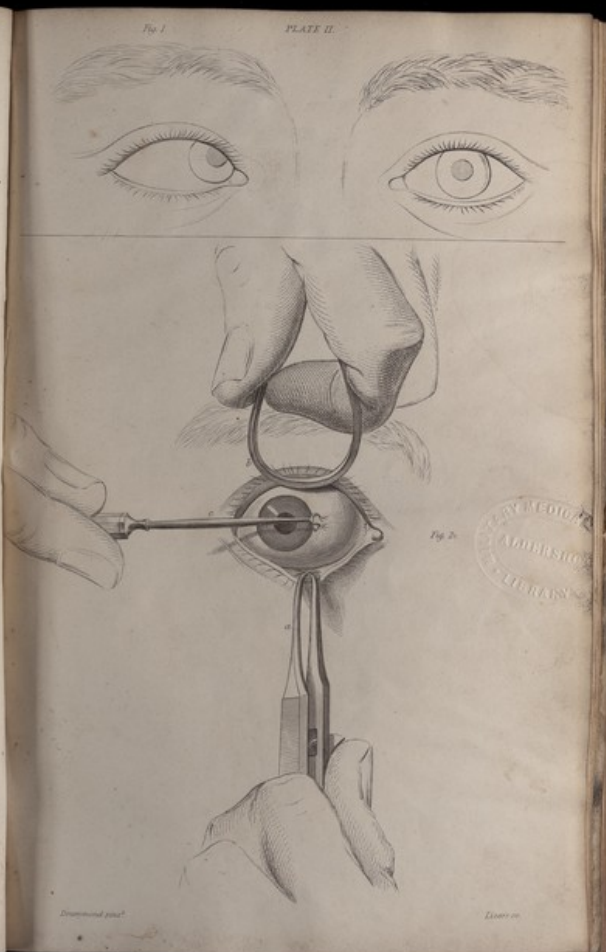


Fig 2.

ACADEMIA
MEDICO
CHIRURGICA
LIBRARY

Drummond pinx.

Lizars sc.

PLATE III.

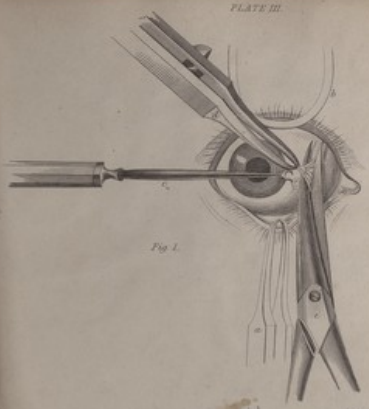


Fig 1.

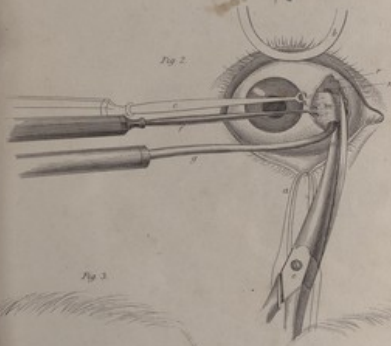


Fig 2.

Fig 3.

Drummond pinxt

Lizars sc

THE

# STUDY OF CHEMISTRY

CONSIDERED AS A BRANCH OF

## ELEMENTARY EDUCATION:

TO WHICH IS APPENDED,

A SHORT STATEMENT

AS TO THE

LECTURES ON THE CHEMISTRY OF DAILY LIFE,

NOW IN PROGRESS AT EXETER HALL,

UNDER THE SANCTION OF THE COMMITTEE OF THE

**Privy Council on Education.**


BY D. B. REID, M.D. F.R.S.E.

FELLOW OF THE ROYAL COLLEGE OF PHYSICIANS OF EDINBURGH;
HONORARY MEMBER OF THE IMPERIAL MEDICO-CHIRURGICAL ACADEMY OF ST. PETERSBURGH,
AND OF THE HUNTERIAN MEDICAL SOCIETY OF EDINBURGH;
MEMBER OF THE MEDICO-CHIRURGICAL SOCIETY OF LONDON;
FORMERLY VICE-PRESIDENT OF THE SOCIETY OF ARTS FOR SCOTLAND;
CONDUCTOR OF THE CLASSES OF PRACTICAL CHEMISTRY IN THE UNIVERSITY OF EDINBURGH;
AND SENIOR PRESIDENT OF THE ROYAL MEDICAL SOCIETY OF EDINBURGH.


*SECOND EDITION.*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1842.

PRICE TWOPENCE.

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Further information, and a Syllabus of the Course, may be obtained at 15, Duke Street, Westminster.

# PRELIMINARY REMARKS.

"Nothing, however, would be of greater practical importance than the institution of normal schools or public boards, where all who intend to introduce scientific subjects in their schools and academies, might have an opportunity of examining in detail the apparatus which may be required, and of being assisted in acquiring the art of performing the necessary illustrative experiments."—From the first edition of "The Study of Chemistry," nearly 100,000 copies of which have been printed in different forms since the year 1836.

The greater part of the first edition of this pamphlet appeared in "Chambers's Edinburgh Journal," June 1836.

THE object of the brief remarks contained in this pamphlet is to bring under general notice the importance of conjoining the study of the Alphabet of Nature and of Science in elementary schools, with the ordinary branches of education. It is considered that, by the proceedings already adopted in some schools in this country; by the numerous courses which have been conducted by the Author, more especially at Edinburgh, during the last twelve years, with the view of placing this question on a more accessible footing even in the humblest schools; and by that which can be seen in operation at present, at Exeter Hall, in the course now in progress under the sanction of the Committee of the Privy Council on Education, ample proof is given of the practicability of the system recommended; and that teachers would be as willing to enter upon the necessary duties, were they properly instructed, as the pupils would be to attend to their demonstrations. One hour a week, for a single year, would be amply sufficient for all the more important results anticipated; while further attention might be given to Chemistry, or other branches, afterwards, in individual schools, as circumstances might dictate.

The benefits arising from such a course would be—

I. A practical knowledge of some of the most important laws affecting health.

II. A practical knowledge of ventilation, and of the means, in many cases equally simple and economical, by which the more oppressive evils of a vitiated atmosphere may be removed.

III. A knowledge of the more important elements of which the material world is composed; of their action upon each other, and upon the human frame. The key that would thus be given in early life to the works of nature and the operations of art, would necessarily have the following advantages:—

1. The lessons given, though few in number, would be equivalent to a great and extended course, when multiplied, after a few years, by the experience of daily life in those objects to which they are directed.

2. The knowledge they would impart being in reference to materials, the nature, use, and adaptation of which to various pur-

poses form the occupation of the great mass of mankind, great improvements in AGRICULTURE, ARCHITECTURE, MEDICINE, ENGINEERING, and, in short, in every branch of Art or Science, would ensue, from the more extensive and familiar knowledge that would then be acquired, by all classes of society, in reference to the nature of the material world.

3. The standard of professional science among those more immediately occupied in professional pursuits would be advanced, as there would then be an opportunity of training the eye and the ear to observation, and the hand to manipulation, in early life: without these, however much the intellect may be trained, it is impossible to educate so accomplished observers, or such accurate experimenters in science. Elementary instruction in science has, in other respects also, become essential for young persons intended for professions where a knowledge of physical science is necessary; as, from the great progress now made in all its branches, it would be as impossible to expect the medical man, the engineer, the architect, the manufacturer, and all who are interested in science, to obtain that amount of information from the usual course of education which is now required, without some previous training in elementary schools, as it would be for any one to attain a proper rank as a scholar, or a mathematician, were he never to enter upon the study of classics or mathematics till he should join a university. Even now, in some professions, it is observed that the period of professional education is not adapted to the present state of science; and if elementary instruction, in some branches, at least, be not provided systematically in schools and academies, an extended period must be allotted to it at a future time, which would bear heavily on the means and resources of the advanced student. But if this course be omitted, College and University courses must be kept at a low par, compared with the ground they would take were professors not compelled, as they too often are at present, to begin their courses with the most simple and elementary facts, which might be taught more advantageously before the pupils come to them.

4. The resources of the rich, the means of the poor, and the comforts of both, would necessarily be increased by the greater power that would be acquired in the production of agricultural and manufactured articles, as well as by increased economy and comfort in their use.

5. It would give the pupils a new and more expanded view of the works of the Creator, and open to their notice innumerable sources of observation, which would tend materially, in certain classes of society, to prevent the power and influence of dissipation, which, it is believed, is frequently commenced, not so much from the attractions it presents, as from individuals having no other interesting means of occupation, when not engaged in their daily pursuits.

# STUDY OF CHEMISTRY,

*&c. &c.*

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FEW circumstances have tended more to characterize the present age than the great progress that has been made in the cause of education. This question, of such vital interest to the well-being of society, has been broadly entered into, not only with the view of improving details, but of placing the whole system on a more rational foundation, in better accordance with the spirit of the age, and the constitution of the human mind. Nor can we look to any of the great institutions of this country, or even into the more humble walks of individual life, without tracing the more marked and willing attention it now engages, and the great efforts made to extend its influence in every class of the community. The state of the mind in youth—its ardent curiosity—its freshness and healthy tone—its flexibility—its disposition to imitate the examples set before it—the delight with which it gazes at every novelty—the avidity with which it listens to every tale—the alacrity with which all its efforts are accompanied—and the mighty influence of early impressions, habits, and associations, have all been made to bear on education with the happiest effects. The unnatural system of oppressing boys with mere words, mere facts or knowledge of any kind whatever, learned by rote, and overloading the memory without giving any rational training to the mind, has been justly exploded. This extraordinary movement of the public mind regarding education is not more important than the methods which have been adopted for the diffusion of knowledge. It is every where simplified, divested as much as possible of technicalities, presented in a clear and intelligible language, and brought home to the concerns of men. So far from being superficial, it is often of the most solid character, being neither clogged with the details, nor encumbered with the distinctions of complicated systems. It goes more directly to leading truths and fundamental principles. As much real information is frequently conveyed in a pamphlet as used to be contained in a folio; and popular lectures on the most important branches of human knowledge are now open to all classes, so that every one has an opportunity of becoming acquainted with subjects which, in former times, were accessible only to those who could afford to devote years to study and seclusion.

But great as the progress has been that may be traced in the

schools of the present day, one department of knowledge is still generally omitted in elementary schools. The alphabet of literature may be taught, and the formation of character may be studied, by the zealous schoolmaster, so as to give a force and individuality to his instructions unknown in former times; and even drawing and music may now be added among the later and more important additions to general instruction in schools, but the alphabet of nature and of science—that which forms the root of all improvements in art and science—has not hitherto been generally introduced; and even where attempts to effect such an object are made, they are still too frequently subject to misapprehension, which cannot be expected to be satisfied till society shall lend a still more willing attention to the realities of science, and the invaluable applications of which it is susceptible in all the varied walks of life. Let it look for a moment to the facts which statistical tables have brought to light connected with the health of whole communities in different districts at home and abroad—let it examine the records of medical men during the last century, as to the state of health and disease during the same period, and the views they have continued to express with a daily increasing warmth, and certainly never with more force, or in more varied publications, than have appeared at the present times—let it study the numerous invaluable parliamentary reports on the same subject, and the amount of distress, disease, and death, that have occurred at sea and on shore, in this kingdom and the colonies—amidst the peaceful occupations of industry, or among soldiers and sailors, who have been subject in their habitations to the influence of circumstances injurious to life—among those enjoying the prime of life, or struggling with the weakness of infancy or of age—and what are the great and obvious conclusions, that occur to every one who will pause and reflect upon the facts thus accumulated, with some knowledge of the constitution of his own frame, and of its relations to those agents by which it is perpetually surrounded throughout the whole period of his existence? He sees, as he traces the physical life of the body in connection with the agents by which it is influenced, that the average duration of human life is shortened to a great mass of society by their ignorance of the first elements of the laws of health; that colds, pleurisies, rheumatisms, fevers, consumption, and numerous other diseases, annually destroy their thousands, or deteriorate the constitution and embitter the lives of others, in cases where such evils might have been avoided by a proper attention to circumstances that have now been explained;—that even where such pressing calamities do not occur, the mental and bodily strength is often reduced to a low par, both in public assemblies and in private dwelling-houses, by the noxious influence of an oppressive atmosphere loaded with the products of respiration—a circumstance that never occurs when man does not obstruct, by the construction of his habitations, the natural laws by



which the exhausted air around him is otherwise perpetually removed;—that the resources of the poor are much diminished at times by their want of information as to the economy and management of fuel, gas, lamps, and numerous other matters that minister to the comforts of daily life;—that whole districts are often subject to different nuisances from manufactories that would not be tolerated were their pernicious influence more thoroughly understood, and that others would never be produced were workmen generally instructed in some of the most elementary facts of science, which would enable them to observe and conduct with care and attention the processes of combustion and other familiar operations, the mismanagement of which is so frequent a source of annoyance, and at the same time very generally a sure indication of wasteful expenditure;—that accidents from fire are often aggravated, and sometimes caused, by ignorance of the most elementary facts connected with the nature of combustion; and that were these subjects more carefully studied, not only by those engaged professedly in practical science, but by all who have the care and management of fires, there would not only be a great increase of comfort and economy in individual habitations, but a great reduction in the amount of some of the more offensive impurities communicated to the atmosphere in large cities, as greater skill in the management of fuel might be acquired, and improvements in practical science more generally adopted.

But it is unnecessary to extend illustrations that may be almost indefinitely multiplied. If the facts be admitted that have now been adverted to—facts which are, indeed, incontrovertible, and familiar to the experience of every one who does not shut his eyes to the evidence which he may gather on every side, the next question is the remedy which it may be practicable to apply to evils of such magnitude.

The author of these brief remarks does not profess to expound any new remedy. He joins with those who advocate the cause of general instruction in the elements of science as the most effective means of giving information as to the evils mentioned, of pointing out the remedies that are required, and of facilitating the introduction of important legislative enactments for the improvement of public health. The evils which it is desirable to counteract are so universal in their operation, and, at the same time, so much under the control and management of individual arrangements, that no confidence can be entertained in any measure of relief that is not equally general in its application, and susceptible of being adopted under the ever-varying progress of improvement, and in the endless variety of circumstances in which human life is exposed: and what remedy is so universal, and so capable of penetrating into all the varied channels of society, where its power is required, as the instruction of all classes in the great

and leading truths of science which explain the reciprocal action that ensues between the human frame and those external agents to which it is exposed?

Then, indeed, the first elements of health would be generally understood. The great truths taught in early days, when multiplied into the experience of daily life, would tell with tenfold value in unfolding numerous evils that continually beset us, and in pointing out the means for preventing their injurious effects. The medical practitioner would be enabled to trace, with increased power, the causes of disease; the architect would design with a more extended knowledge of ventilation, instead of appending ventilation to structures already designed, and adapt the habitations which he builds to the structure of the human frame; the clergyman would not so frequently address an unwilling or indifferent congregation, oppressed by an atmosphere which renders them too often as indifferent to his address as his powers are weakened and worn down by the polluted air which he may inhale; and, in short, there would be no class of society, and no period of life, that would not be benefitted by the general introduction of the elements of science in elementary schools. Again, among those whose more especial duty it is to attend to the wants and comforts of daily life, this knowledge may be considered essential to the proper execution of their duties, and would not only enable them to perform these more effectually and economically, but to follow out practically, in numerous cases of disease, the important directions of the medical attendant as to the state of the atmosphere, and even, in extreme cases, to soften the bitterness of sickness and of the death-bed, where the sufferings of the patient can be alleviated by careful attention to external agents.

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It has pleased the Author of nature so to form man, that he is forced to attend to the objects with which he is surrounded; all his organs of sense have been given for this purpose. The materials of usefulness have been placed before him, but his skill, activity, and knowledge, are required to enable him to make a proper use of them. He is called upon to obey this great law by the first instincts and most imperious wants of his nature; and it is to the difficulties he has to contend with under such circumstances, that we owe the development of many of the more ennobling qualities of the human mind.

To study the laws of nature, then, is to study the laws which the Author of nature has ordained for the happiness and improvement of the human race; and it is not only to ignorance or neglect of the duties which morality and religion have imposed, but also to our ignorance or neglect of those physical laws, that a large share of most of the evils of life can be traced. The physical sciences, then,



which investigate these laws, and apply them to the purposes of life, not only form a most essential part of that knowledge which is most necessary to man, but every step we advance tends more and more to exalt our ideas of the wisdom, power, and beneficence of their Author. It is impossible to contemplate the progress of society without seeing how much man is indebted to the cultivation of physical science. If we compare his first rude and feeble essays with the almost incredible energies which he now employs, and contrast the helplessness of the savage with the comfort, security, and intelligence of civilized life, we perceive at once what science has done for man, and can form some conjecture of what it may yet be destined to perform.

Amongst the different departments of physical science that have engaged attention of late years, Chemistry has taken a leading part. While it has been advancing to its station as one of the most interesting of the sciences and most useful of the arts, its progress has been marked by the singular nature and unexpected character of the new relations it has disclosed. It has, indeed, thrown a new light on the phenomena of nature, and explained a thousand mysterious operations, of which, formerly, we were completely ignorant. Chemistry, also, in unveiling the natural operations that are carried on at the surface of the globe, has made us acquainted with numberless agencies, whose continued action is essentially necessary to preserve the order of nature, and affords a new display of that stupendous power and wisdom that commanded order out of chaos, and imposed upon every atom powers as necessary to the present state of nature, as the regularity of those movements that keep the mightiest orbs balanced in their spheres; so that, amidst incessant changes, no jarring element is allowed to disturb the harmony of the whole.

I may here be allowed briefly to state the claims which chemistry has to be considered as a branch of general education, and the important purposes it may be made to serve in the training of youth. It is not merely the knowledge it conveys, and the value and extent of its applications, but from the nature of its methods and reasonings, from the power and energy of the agents it employs, and from the striking character of the phenomena which its processes exhibit, all eminently calculated to awaken curiosity and fix the attention, that he mind of the young pupil, instead of being forced to a compulsory exercise, is led, by the interest it takes in the subject, to exert itself in a way eminently calculated to invigorate its faculties, and to cultivate its powers of attention, observation, and reasoning. The study of chemistry, then, independently of the knowledge it imparts, affords a discipline of the mind of the highest importance in the education of youth. It is also admirably adapted to form a pleasing and interesting pursuit, as he who is acquainted with chemistry has a new key to explain the works of nature; nor

can he walk abroad without finding in all her operations, and in all the products of the material world, a new and interesting source of instruction and amusement.

But chemistry stands on grounds altogether peculiar, when its practical relation to the materials that affect man every moment during the whole period of his existence is considered. No one can study the phenomena of respiration,—the nature and varieties of atmosphere to which the human frame is exposed,—the theory of combustion,—the communication of heat,—the production of artificial light,—the purification of water,—the evolution of poisonous gases, and other deleterious impurities,—or any portion of the infinite variety of facts which this science has pointed out or explained, without seeing the important position which it bears to the general economy and management of the means provided by the Author of Nature for the existence and the comfort of man.

Again, it becomes still more important, from the facility with which all the leading truths it presents can be taught with the assistance of a very simple and economical apparatus, such as can be procured without difficulty by the schoolmasters in almost any part of the kingdom. It will be recollected, that it is not contemplated to engage the attention of the teacher in primary schools with complicated instruments, but rather to render him familiar with the illustrations that may be given, even where he is left almost entirely to his own resources, with neither materials nor apparatus beyond those that every country village may present.

Chemistry also stands on grounds altogether peculiar, when the nature of the investigations which it comprises is taken into consideration. In some respect, indeed, it may be considered more instructive and more awakening, in the views which it unfolds of the material world, than any other branch of science, as it teaches the nature and composition of different kinds of matter. It replies to the first question proposed as to all matters that may come under examination—it tells us what they are; and therefore chemistry may be truly said to be more elementary in the kind of knowledge which it conveys than any other branch of science.

Every one, in reality, is more or less a practical chemist, whether he shall study chemistry systematically or not; and the question, therefore, is, how far, in the present state of society, it may be proper to introduce, as a general branch of education, a course of such select illustrations as may enable all to become familiar with those facts connected with this science that influence the comfort and economy of daily life.

Such a course would have the advantage of introducing the young pupil to a more precise understanding of the nature of the material world in which he is placed; and thus he would be led to connect, with the explanations given in the school-room, a large share of the phenomena of nature and of art, of which, under



ordinary circumstances, he is comparatively unobservant, from the want of a proper key.

Every one who is at all practically acquainted with the business of education, is well aware of the difficulty of fixing the attention of young persons, and presenting such exercises as are best calculated to awaken and strengthen the various faculties of the mind. From the vivacity of the youthful mind, it is continually attracted by external objects, and starting aside from the subject. This natural tendency, arising from the liveliness of its sensations, and the interest it takes in external objects, is, no doubt, implanted for the most useful purposes; and it most particularly deserves attention, that, with a view of converting it into a means of acquiring knowledge, and improving the understanding, the study of chemistry is pre-eminently useful. There, indeed, the senses are made purveyors to the mind, and facts and principles, deduced, as it were, by its own observation, give the greatest accuracy and precision to the new ideas thus acquired. Chemistry is a branch of knowledge which may, perhaps, be introduced with greater facility than any other science. The phenomena it presents are more striking; they are connected with so many objects of daily life.

A sufficient amount of information in those branches of science which are most useful and interesting, may be easily communicated in a course of thirty or forty lessons: and if these be given for one hour each successive week, they cannot, to any extent, interfere with the ordinary business of education. And if, during each successive session, a series of lessons in each of the more important sciences be given, the mind of the pupil becomes slowly and gradually alive to all the more interesting phenomena of nature and processes of art; whereas he who has not enjoyed such opportunities will pass them by unnoticed, comparatively insensible and regardless of the properties which the Author of nature has impressed upon the material creation. But it may be asked, who are to be the teachers in this new course? To confine ourselves, at present, to chemistry: with the assistance of a text-book, the performance of the more important elementary illustrative experiments will not be difficult to any of those numerous teachers whose zeal and intelligence may lead them to engage in this cause. Several have already tried it, and have publicly announced their intention of continuing it in their schools and academies; and I have not yet met with any intelligent teacher who, even after no more than a week's training in the laboratory, found any difficulty in introducing the more simple illustrations of chemical science, amply sufficient to lay a sure foundation for the future progress of the pupils, and to excite a lively interest in scientific pursuits.

Though a complete and extended course of chemical experiments can be given only where the proper facilities for operating are to be met with, the introduction of a system of testing and operating upon

a small scale, as a means of facilitating the progress of the student, is of the greatest practical importance. He who provides himself with a few slips of glass*, such as glaziers cut in fitting panes of glass to window-frames, a few phials with acids and alkalies, and a small quantity of fifty or sixty of the more important chemical preparations, not only provides himself with a small museum to which he can continually refer, but can also perform, with a part of the materials, several thousand experiments, and study them leisurely at home with his text-book before him, repeating those which may be more complicated, till he becomes familiar with them.

The small museums of tests and specimens, prepared by Mr. Macfarlane, of Edinburgh, are arranged in the manner I have recommended. They contain about sixty specimens of the most important chemical preparations, including a few phials with acids and alkalies, a test tube, slips of flat glass, filtering paper, and test paper. These alone, independent of the larger and more complete portable laboratories and chemical test boxes, cannot fail to be of the highest value to the student of chemistry. I do not hesitate to affirm, that he who provides himself with such specimens, and learns the method of operating with flat glass, will acquire, by frequently testing his materials at home, an available knowledge of the science, and a specific recollection of the leading truths it presents, which he who contents himself with what he sees in the class-room can never attain. However important the demonstrations and exercises there may be, still the student is too often apt to imagine that he is perfectly familiar with the subject, because he can follow the connected exposition given by the teacher; but when he begins alone, and is left entirely to his own resources at home, then he soon finds out what he does know and what he does not, and is put in the train of mentioning his difficulties to his teacher, and paying a more close attention to every thing that is brought before him.

In using these materials, each of the sixty specimens can be exposed on the flat glass to the action of heat, of water, of acids, of alkalies, and of each other; so that, before entering upon any complicated mixture, the student can easily try thousands of experiments. If any one contrast the progress of a student who has been accustomed to operate in this manner, with that of another who has never availed himself of this means of information, who has only seen a specimen in a museum or lecture-room, instead of having the opportunity of recurring to it, and operating with it as often as he may wish, he will at once perceive the benefit that accompanies the frequent repetition of experiments on the small scale, each of which may present phenomena as palpably to the

* Details will be found, in Dr. Reid's elementary works on Chemistry, as to the use of flat glass, &c.



eye as they are observed in the demonstrations of the lecture-room. Those who have not witnessed the amount of instructive and interesting experiments which can be performed by all the pupils in any school or academy, with the most simple means, where hundreds may be operating at the same moment, cannot appreciate the zeal and enthusiasm with which the students enter upon the experimental department, the practical benefit which they derive from such instruction, and the mental training which necessarily accompanies it. Nor is it a matter of small importance, that the adaptation for educational purposes of those modes of operating on a small scale which analytical chemists have so successfully cultivated, promises to be equally useful to the professional student, to those who study science as an intellectual pursuit, and to the artizan, who may require to test the various materials with which he works. Of late, indeed, I have seen the slips of glass used in a chemical manufactory by the workmen, in testing the materials which they employed.

But the difficulty of understanding scientific subjects has been urged against their introduction as branches of general education. If the great object be kept in view, that the mind of the young student is to be awakened to the nature of science, and not perplexed with elaborate details, which can be important to those alone who are engaged professionally with scientific pursuits, this objection will be passed over by all who have had any opportunity of observing at how early a period young persons may be led to take an interest in science. They fix the attention more forcibly than the ordinary branches of education; all the phenomena of experimental science excite an interest in the student by the manner in which they appeal to the external senses; and when practical exercises are at the same time introduced, they contribute to give habits of observation, attention, and action; and what are of more importance in the training of youth? There the student's mind is necessarily active, for he is led to watch for an expected result, the progress of which depends upon his own exertions; he must judge of the varying appearances that are successively evolved, and regulate in all their changes the phenomena which present themselves to his notice. I am not indeed aware of any one who has carefully tried the experiment, who has not found that the study of the great truths of science is much less difficult than the study of the different languages.

It is, perhaps, impossible to calculate how great the advantages to society would be, were every individual taught the elements of physical science at an early period, and made familiar with the nature and qualities of those materials with which he is surrounded every moment of his life, and whose continued action exerts so powerful an influence upon his system. If we look to chemistry alone, how much light has it thrown upon the physical constitution of man, and how much might be added to our comforts, to take a

to familiar illustration, were the laws it has pointed out in reference respiration, combustion, and ventilation, to be made a more especial object of attention in the construction of every kind of building! In the palace and in the cottage, the advantages would be equally manifest; and it is, indeed, difficult to conceive any situation in life, where a knowledge of these laws might not be advantageously applied. How many of those, again, who are practically engaged in particular arts, cannot examine the purity and the value of those materials with which they work! Surely for those alone a particular line of instruction should be adopted, to whom more elaborate courses may not be accessible, such as are intended for other classes of society who have more means and more opportunities at their command. Again, for those who emigrate to a distant land, how important would it be to make them practically familiar with the examination of water in all its varieties, the construction of fire-places and furnaces adapted for different kinds of fuel, and the examination of limestone and one or two more minerals of great value to every community! How important an influence might the traveller, also, and even the missionary, occasionally exercise, were they capable of pointing out at times, in a remote region, some of those practical applications of science which so often suggest themselves to every intelligent and well-informed mind! How much, also, would it in many cases promote the more immediate object they may have in view, by insuring that respect and confidence which superior intelligence always commands, when it is observed in any ordinary matter of which all individuals may be competent judges!

The landed proprietor, the agriculturist, and the manufacturer, are surely interested in the chemical history of soils and minerals. The farmer is only beginning to perceive how great the importance of chemistry is to agriculture, and to acknowledge the vast benefit that may be anticipated when its nature and applications shall be better known. To the engineer, analytical chemistry is often of the utmost practical importance; the miner by its aid ascertains the value of the ores which he extracts from the earth. To the medical man, chemistry is indispensable, supplying him at once with the most important information as to the constitution of the human frame, and with many of the most powerful means of alleviating human suffering. To the officer engaged in the survey of any distant station, chemistry is, in many cases, equally necessary, enabling him to give a useful report on the mineral productions, &c. of any place which he may be called upon to visit. In the arts, again, and in daily life, to whom is chemistry not interesting and useful, independent of those who are engaged in operations founded entirely upon chemical principles? Is there any one to whom the magnificent view it unfolds of the works of creation can be presented, without tending to give him a more exalted view of that



creation in which he is placed? Is there any one to whom a knowledge of the laws of heat and cold, and the various discoveries that have been made as to the history of air, water, steam, gas, fuel, and so on, may not prove practically useful?

No one can avoid remarking the more extended views which are now taken of the varied branches of knowledge which minister to the wants and comforts of life—the more careful selection of those objects and pursuits which are most deserving of attention—and, above all, the unqualified and practical admission of the great truth, that, in every situation of life, however exalted or humble, man has been created with a capacity to enjoy and to improve by a knowledge of science. It is, indeed, extending rapidly among all classes of society. The various popular courses which have increased so much of late years, the schools of art and mechanics' institutions, as well as the numerous scientific associations that have appeared in every part of the country, and the more general attention which matters of science now attract, lead to the hope that the time is not far distant when every member of society will have an opportunity of acquiring some practical instruction in those departments at least, a knowledge of which is intimately connected with the phenomena of daily life, and with those operations in which he may also be professionally interested.

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The Course of Lectures now in progress at Exeter Hall, under the sanction of the Committee of the Privy Council on Education, forms the Fourteenth Series of Illustrations that have been given during the last twelve years, with the view of promoting the general introduction of physical science into schools and academies.

The under-mentioned courses were not connected with any of the more extended practical and systematic courses given to professional students. Many of the pupils who attended these, however, have subsequently introduced similar courses in the Colonies. Missionaries, Officers in the Army and Navy, and Emigrants, have been instructed according to the same system. An assortment of apparatus was forwarded, a few years ago, under the direction of General Wilson (of the Imperial Russian Service), for a school attached to the government works at Alexandroski, near St. Petersburgh; and two sets of apparatus are now in the course of preparation in this city, one of which is to be sent to Bombay, and another to the West Indies, with the view of promoting the more general introduction of a knowledge of the chemistry of daily life.

The following list comprises a statement of the principal places where these illustrations have been given. In some cases the illustrations have been included in a single lecture, but in general they have extended from five to thirty lectures, or practical lessons.

| | |
|---|---|
| Heriot's Hospital, by the permission of the Town Council of Edinburgh, and the Governors of Heriot's Hospital | Edinburgh. |
| Royal Society of Arts | |
| School of Arts | |
| Assembly Rooms, George Street (to Boys from different Schools and Academies) | |
| Scottish Institution, Moray Place | |
| Leith Mechanics' Institution | |
| At the Meeting of the British Association | Dublin. |
| Royal Institution, Athenæum, and Mechanics' Institution | Manchester. |
| National Schools, Westminster | London. |
| British and Foreign School, Borough Road | |
| London Mechanics' Institution | |
| Willis's Rooms, St. James's | |
| United Service Museum, Whitehall | |
| Exeter Hall, under the sanction of the Committee of the Privy Council on Education | |

In 1835, Dr. Reid submitted the experimental arrangements proposed to be introduced by teachers, to a Committee of the House of Commons on Education, and has to acknowledge the opportunity he thus had of shewing practically the details of his system to Mr. Wyse, Sir D. J. Norreys, and Mr. Smith O'Brien. Numerous illustrations have also been given on special occasions; more particularly at Edinburgh, Dalkeith, Haddington, Montrose, Arbroath, and other places in Scotland.

The Juvenile Course, which precedes the lectures, is given with the view of shewing to the teachers who attend Dr. Reid's lectures at Exeter Hall, the system which he has pursued during the last twelve years, in advocating the importance of the general introduction of elementary lessons in science in all schools and academies, more especially with the view of improving health, and adding to the comforts of all classes of society.

The admission to the Lectures has in general been free, no one engaged in teaching having been refused admission who applied for it, so far as Dr. Reid is aware. One thousand free tickets were placed at the disposal of the Committee of the Privy Council on Education.

Dr. Reid has to state, however, that he has received a partial assistance towards the expenses, by the sale of tickets. He has also to acknowledge that Mr. Kay Shuttleworth and Mr. Chester undertook to pay a part of such expenses as were incurred for rent, should there not be sufficient tickets sold for this purpose, in consequence of the free distribution of tickets with which the course was commenced.

Wilson & Ogilvy, 57, Skinner Street, Snowhill, London.

THE

# SUBSTANCE

OF A

# LECTURE

ON THE

## STRUCTURE AND PHYSIOLOGY OF MAN

AND OF THE

## LOWER ANIMALS:

DELIVERED TO THE MEMBERS OF THE CARLISLE MECHANICS' INSTITUTE, NOVEMBER 11, 1833,

BY

THOMAS BARNES, M.D., F.R.S.E.,

MEMBER OF THE ROYAL COLLEGE OF SURGEONS, LONDON, AND OF THE ROYAL MEDICAL SOCIETY, EDINBURGH, ETC.

CARLISLE:

PRINTED BY J. STEEL, PEASCOD'S LANE, ENGLISH-STREET.

1838.

TO

## THOMAS RYMER JONES, ESQ., F.Z.S.

PROFESSOR OF COMPARATIVE ANATOMY, IN KING'S COLLEGE, LONDON,

DEAR SIR,

On reading the syllabus of a course of Lectures you are about to deliver in Carlisle, it occurred to me, that I had given a brief, though very imperfect outline of these Lectures, in an introductory Discourse I delivered in the Carlisle Mechanics' Institute, some years ago. The Discourse I allude to was, I believe, the first ever delivered in that Institution, and I now offer the substance of it to the public, in the hope that the attention of some persons may be drawn to the interesting subject of which it treats, and they may be induced to attend your course of Lectures, from which I am sure they will receive both instruction and delight. It affords me great pleasure to find, that the rough sketch I had drawn is to be filled up by so able a person as yourself, and to no one can I dedicate it more suitably than to you, who cultivate Comparative Anatomy with so much ardour and success; and who teach that science with so much perspicuity, and in a manner both entertaining and agreeable.

I am, dear Sir,

Your's very truly,

THOS. BARNES.

Carlisle, Sept. 19th, 1838.

# LECTURE.

Before entering upon the immediate subject of this lecture, I shall take the liberty of making a few introductory remarks on the constitution of external nature. If we take a general view of the earth, or this planet which we inhabit, we find that it consists of a variety of substances or bodies; some animate, and some inanimate. Animals and vegetables are animated bodies. Minerals are inanimate bodies. The former are nourished and supported by air and food, and are regularly organised; they are composed of many different organs very wonderfully constructed and arranged. By means of these organs they contribute to their own growth, and continue their species, and the individuals of each species, in a natural and healthy state, have all the same structure. Inanimate bodies, on the other hand, are not organised, and though often of regular figures, they grow larger by external apposition. Minerals may, therefore, be readily distinguished from animals and vegetables, but between the latter there is a strong analogy; though their mechanism is widely different, in some of their functions or actions there is a close resemblance.

I shall point out to you some of their characteristic properties. Vegetables, as you are all aware, live and grow by their roots, i. e., they take in nourishment by their roots. Animals live and grow by taking food into their stomachs—so that the stomach may be considered the root of the animal, and the root may be considered as the stomach of the plant. Vegetables have a more limited economy; nutrition and reproduction are their only apparent functions. Besides these functions, animals are endowed with sensation and volition, which properties I shall have occasion to describe to you by and bye. While vegetables are fixed to a spot, animals move from place to place, and are sentient and active beings. There is another difference between them: animals have an internal cavity adapted for the reception of a considerable quantity of food. Vegetables have no such provision.

Minerals are dead inorganic matter from which vegetables derive their nourishment. Animals require food that has been previously organised, either animal or vegetable matter. Minerals are, therefore, subsidiary to the growth of vegetables, and vegetables are necessary to the existence of animals.

On carefully examining the three kingdoms of nature, as they are called, we find that they are arranged in a series or gradation. The mineral kingdom is placed lowest on the scale, and constitutes the food of the simplest vegetables. These simple vegetables decay, and afford nutriment to plants that are more highly organised, and after the materials have undergone several changes in the vegetable kingdom they serve as food to animals. They now enter into new combinations and acquire new properties. In the animal kingdom, we observe a scale of organization. Those animals that subsist on vegetables, generally rank lower on the scale, than carnivorous animals, and man, that subsists on both kinds of food exhibits to us the most



perfect of animated beings;—in the language of the poet—

> "Each moss
> Each shell, each crawling insect, holds a rank
> Important in the plan of Him who framed
> This scale of beings—holds a rank which, lost,
> Would break the chain, and leave behind a gap
> Which Nature's self would rue."

Every department of nature is full of interest, and affords an unbounded scope to an enquiring mind. In the mineral domain, are contained all the inanimate materials of which this globe consists; rocks, volcanoes, metals, earthy and saline minerals, organic remains, and alluvial deposits. These furnish a rich harvest for the mineralogist, the chemist, and the geologist, who find in them beauties unperceived by the eye that merely glances over the exterior.

In the vegetable kingdom, we behold a profusion of bounty and of beauty. In it, we are presented with many objects that excite our admiration and delight, and administer to our wants and comforts. Plants are organised living beings, and have been supposed to be endowed with a certain degree of feeling and enjoyment. They adorn the earth with their beautiful raiment, perfume the air with their fragrancy, and multiply our pleasures with their delicacy. They supply us with the necessaries of life, and furnish us also with valuable remedies for curing diseases. More than 60,000 species of plants have been discovered in different parts of the world, and more than 3,000 species are enumerated as natives of our own country. These constitute the province of the botanist. But in agriculture, horticulture, medicine, domestic economy, and the arts, a knowledge of the vegetable kingdom is of great practical importance.

The animal kingdom is still more interesting and inviting than the others, and deservedly ranks highest in estimation. What countless numbers, and what endless variety of quadrupeds, birds, serpents, worms, and

insects do we find upon the earth,—and what an infinite number and variety of fishes and marine animals in the sea. The earth, the air, and the waters abound with numberless living creatures: all varying in form, magnitude, and colour; all varying also in habits, manners, strength and instinct; yet all possessing many of the same common organs and functions, which evidently show, that they have been constructed on one and the same plan, by an omnipotent author. The differences, we observe, are only varieties or modifications of the plan, by which each animal is adapted to the peculiar circumstances in which it is placed, and by which its organs are rendered subservient to its peculiar wants, necessities, and enjoyments. Throughout all animated nature, there is a manifest design in the adaptation of animals to their condition. They are adapted by their size and instincts, by their organs and their economy, to the element in which they live, to the kind of food they use, and to the peculiar position and situation they hold in the creation.

If we deliberately examine the structure of an animal, we observe a singular and astonishing mechanism, infinitely surpassing the utmost contrivance of human genius. We find a great number of instruments or organs of a determinate form, and size, and we find these organs performing a variety of offices, or functions. We observe animals to take food and drink, to select what is salutary, and reject what is noxious. We observe in them digestion, circulation, and respiration. We observe that they have certain habits of acting, and that they vary these habits according to circumstances, and that they not only make use of a variety of means for their preservation, but also adopt effectual measures for the permanent continuance of their species.

Animals, as you all know, differ much in form and magnitude. There are many animated beings so



small as to be quite invisible to the naked eye, and can only be discovered by the microscope. Myriads of animals, many thousand times smaller than a mite can be detected by that instrument. Without the microscope the wonders of minute creation would be entirely unknown to us. Almost every fluid in nature contains small atomic beings. Stagnant water abounds with them. The least of the whole tribe has been called a monad, and is not larger than the 24,000th part of an inch—hence it has been computed that in a single drop there are 500,000,000 of these monads. Between a monad and an elephant how great is the difference,—and what an inconceivable variety is there, in the size and form of animals between these two extremes. To the animal kingdom we ourselves belong, and the study of this branch of natural history is termed zoology. It comprehends more than 100,000 known distinct species of beings, each of which is wonderfully made, and acts an important part in the economy of nature. As man is the most perfect of animated beings, he stands at the head of the whole. The structure of his body is universally admitted to be the master-piece of the Almighty, and man has not inaptly been designated "the lord of the universe."

As no branch of knowledge is so useful and interesting, as that which relates to the human species, I shall at present beg leave to direct your attention to this important subject. After we have examined the structure and physiology of the human body, we will take a comparative view of the structure of the lower animals.

Notwithstanding the different appearances of mankind, and the many varieties of the human race; notwithstanding their difference in stature, form, and colour, and the astonishing diversity that exists among the different nations of the world, we find that all men

have nearly the same structure; from which I think we might fairly infer, if we had no other evidence, that they have proceeded from one common parent. And there is another important inference, which we may draw from this subject, and from the nature and phenomena of living beings. As the structure of the human body is the same now as it was in the earliest ages of the world, and as all the species of animals and vegetables of the present day, preserve their original characters, we must conclude, that the same supreme intelligence which first formed and disposed them, still continues to watch over and protect them.

There is not in the whole fabric of the human body such a thing as chance or accident. In every part are many evident proofs of design, skill, contrivance, and we may, with truth, say, that we are fearfully and wonderfully made. There is an assemblage of organs curiously formed, varying in composition, structure, and office, and having a principle of life and action. Much of our happiness depends on the good order of the different organs of the body, and much of our misery on their derangement. It is very extraordinary, and I am sorry to remark, that while every other branch of knowledge is cultivated with assiduity and zeal, the mechanism and functions of the human body are little studied or attended to, except by medical men.

The body is the vehicle of the soul, and the various organs are the instruments it employs in acquiring ideas, and in performing all its operations. Surely nothing can be more interesting to any one than the examination of the most perfect of God's works, nothing more instructive than an enquiry into the means, by which we live, and move, and have our being.

The human body, we observe, possesses the power of motion and of sensation or feeling. On examining the machine we f d instruments for these purposes.



The bones and muscles are admirably contrived for motion. The body is composed of a pile of bones which constitutes the frame work upon which the softer parts are built and extended. This assemblage of bones is called the skeleton. It sustains, and gives attachment and defence to the softer parts. In the human body there are 245 bones. They are connected with each other, and their extremeties are differently formed and fitted for a variety of motions. In some joints there is a ball and socket, a large head is received into a deep cavity, as in the hip joint. In others a round head is received into a superficial cavity, as in the shoulder joint. In some there is an articulation like the hinge of a door or window, as in the elbow and the knee joints. There are various other joinings, or forms of articulation, in the human body. The articulating surfaces are covered with a very smoothly polished substance called cartilage or gristle, which enables them to move freely upon each other with little friction. They are lubricated by a very slippery mucilaginous fluid, named synovia or joint oil, which answers the same purpose in the joints as oil in a piece of machinery. The escape of this fluid from the joints is prevented by a band called capsular ligament. The bones are firmly fixed together at their articulations by strong bandages or ligaments, which permit all those motions which the joint is intended to perform. About 100 ligaments have been described and named by anatomists.

But the bones cannot move themselves; they require moving agents, which are called muscles. These consist of a bundle of soft fibres, which have the power of shortening themselves with great force. They constitute what is generally called the flesh, and are attached to tendons or sinews, and these latter to the bones. The number of muscles in the human body is about 450. It is by the action of the muscles that the body is transported from place to place, and it is

this locomotion, as it is denominated, which forms the great line of distinction between the vegetable and animal kingdoms.

The bones of animals have some resemblance to the wood of vegetables; each perform a similar office. They are the hardest and most solid parts, and give to the other parts support, strength, and character.

The skeleton of man and of many animals is internal, and has a spine or vertebral column for its principal basis. In some animals the skeleton is external, and some have no articulated skeleton. In many animals that have white blood the skeleton is an external crust or shell, and these animals have no vertebral column, hence the division made by naturalists into vertebral and invertebral animals. In some the skeleton forms a part of the organs of apprehension as in the lobster, crab, &c., and is used in seizing and retaining their prey.

In many birds, the large bones are destitute of marrow in their internal cavities. Instead of it, they contain air, and communicate with the lungs by large apertures. This construction renders birds much lighter, and better adapted for flying.

The form of bones is adapted to the functions they perform. There is a mutual relation between the form and function of the several parts of animals; so that a person well acquainted with comparative anatomy will detect the name and habit of an animal, by an examination of its bones, or even of parts of them.*

* Great mistakes, however, are sometimes made by persons not well versed in this subject. President Jefferson fell into an error of this kind. He found a bone which, from its shape, he concluded had belonged to an animal with a claw—to a carnivorous animal. The bone being of a large size, he supposed that it must have been the bone of an antidiluvian lion—to a lion of the ancient world, which he estimated at four times the size of a large ox. This bone he sent to Cuvier of Paris, who examined it, and found that the claw that had been attached to it could not be retracted into the paw of the animal, and, therefore, was not the bone of a lion. The motion of a lion is, like that of a cat, to strike. It retracts its claws. Cuvier observed that the claw must have been very large, and was intended for burrowing or digging. Instead of this being a bone of an enormous lion, as President Jefferson supposed, it was the bone of a sloth, a small animal that digs and feeds on ants.

A few years ago, an occurrence, somewhat similar, took place at Carlisle. Some workmen that were employed in making alterations in the Castle, while cutting loop holes in a wall several feet in thickness, met with a quantity of bones, and a few remnants of a female dress. The bones were supposed to be human, and as some of them were of small size, they were believed to be the remains of a lady and child. Some persons imagined that a dreadful murder had been committed; others thought that the lady, for some frailty, had incurred the punishment of being walled up alive, which is said to have been not uncommon at one period of our history. Another speculation was, that the lady had died in child-bed, during the border war, and had been buried in the Castle. The following week long paragraphs appeared in the Carlisle newspapers, containing these and several other conjectures, which were afterwards copied into the London prints. In "the History and Antiquities of Carlisle," a work of considerable merit, published lately, this circumstance is thus gravely mentioned:—"During some alterations made in 1820, (1819?) a woman and her child were discovered to have been built up in a passage in the Captain's tower. From the costume of the woman it was conjectured, that this horrid crime was perpetrated about the reign of Elizabeth, but who was the unhappy woman, or by whose inhuman orders she and her babe were put to so horrible a death, will probably continue to be a profound mystery." At the time of the occurrence, another medical man and I went to the castle to examine the bones, and we found, to our surprise, that *there was not a human bone among them*; they were the bones of some of the lower animals; and this fact I immediately communicated to the public, in a letter addressed to the Editor of a Carlisle newspaper. So much for the horrid crime, and profound mystery.





In the smaller animals, the muscles are fixed to the skin, or to the scales, by which they are enabled to creep, and in some, they are very numerous. Above 4000 muscles have been counted in the larva of an insect. Besides locomotion, the muscles serve many other important offices in the animal economy. They are instruments of speech, chewing, swallowing, singing, &c.

With regard to the instruments of motion and progression of the human species, I may remark, that the

disproportion in the length of the superior and inferior extremities in man, the structure of the joints of the extremities, the form and width of the pelvis, and the position of the head and heart, all concur in proving him to be a biped. The lower extremities are much larger, and are intended as pillars of support. The upper extremities are well adapted as organs of apprehension, to take hold of things. The hand belongs exclusively to man, and has been called the organ of organs. It gives him that physical superiority he possesses over all other animals. The monkey bears a stronger resemblance to man than any other animal. But the hand of the monkey is as much a foot, as its foot is a hand. Both are calculated for walking and climbing, and for leaping from the branches of trees. The monkey is, therefore, termed a quadrumanous animal, or an animal with four hands. If we compare the human hand with that of the monkey, we find that the thumb is much less in the latter, and that it is also differently formed. In the human hand, the thumb is moveable in every direction, and has a large fleshy ball, which gives it power or strengh, and which constitutes its distinguishing character.

We have now surveyed the machine as adapted to motion. Let us next consider it as possessing sensation or feeling, and the power of directing the various motions of the body. The brain and nerves, by means of the organs of sense, inform us of the properties of surrounding bodies, and direct the motions of the muscles. Without the nerves, the external senses would not convey to the mind impressions made by material objects, nor would the muscles impart to us the power of locomotion. The nerves are white filaments or ropes, of a fibrous texture. They are connected with the brain and spinal marrow, and appear like a continuation of the brainy substance, through every part of the body. From the head and spine, forty trunks or large nerves issue, which afterwards divide into numerous branches and parts. More than 100 of them are distinguished by names.



The nerves are the great source of both pain and pleasure. When any thing hurtful is applied to the body, or when any part is wounded or injured, we feel pain. In a healthy state of the body, the nerves, by means of the senses, are the great sources of all our pleasures and enjoyments. There are nerves adapted to the particular senses. The optic nerve is adapted to the impression of light; the auditory nerve to sound; the olfactory nerve to smell; and the gustatory nerve to taste. There are nerves for the sense of feeling, and also nerves which give the power of motion. The eye is delighted with beautiful prospects, and the ear is charmed with melody. We are regaled with the odours of plants and flowers. The gratification of our wants affords us pleasure. Hunger and fatigue require food and rest, which are great animal pleasures. To all these enjoyments man has a reasoning, thinking, and intelligent principle superadded, which ought to furnish him with the greatest source of pleasure. The brain is the organ of the mind. In man, it is larger in proportion to the nerves that proceed from it, than in any other animal. The great developement of the brain in man, gives him his intellectual superiority. All other animals possess a degree of intelligence, proportional to the resemblance, or approximation of the structure of their brain, to that of man.

Many of the inferior animals, as the leech, lobster, and slug, are provided with nerves and nervous centres, or ganglia, but have no brain, as in man. In the higher order of animals, the number of senses is the same as in man, and in many, they are much more acute, but some of the lower animals are destitute of some of the senses. The sight is wanting in the zoophytes, in several worms, and in many larvæ of insects. All of the moluscæ, and many worms, want the organ of hearing. The most extended sense is that of feeling: it is common to all animals, and resides in the extremities of the nerves of the skin.

We have hitherto considered the human body as being possessed of sensation and volition, or what are termed the animal functions; there now remains to be described the natural functions, or those actions that nourish the body, and repair the several losses which it sustains, and also those actions of the body, upon which life immediately depends, or what are called vital functions. To the former class belong digestion, and absorption; and to the latter, circulation, respiration, and secretion.

A frequent and regular supply of nutriment is required, to promote the growth of the body, and to repair its different parts. We have reason to believe, from the healing of wounds, and the absorption of the bones of animals fed on madder, that the whole materials of the body are completely changed, in a few years. The ancients supposed this change took place every seven years. In infancy and youth, while the body is encreasing in size, the demands for food are more frequent than in manhood, when the growth of the body is stationary, or, in old age, when nutrition diminishes, and the organs, decrease in size. Man is wisely endowed with organs, whose office is, to prepare a supply of reformative and vital matter, adequate to the general demand. The organs employed for this purpose, are called the digestive organs, the chief of which is the alimentary canal. This canal extends from the mouth through the whole range of the intestines, and is, in different parts, of different diameters. Each part is adapted to fulfil the peculiar office it has to perform. First, there is a grinding machine in the mouth, then a narrow tube to convey the ground materials to the stomach, in which they are prepared and elaborated, as in a crucible. Afterwards, the materials pass along another tube, and much more extensive, in which they are mixed with various liquids, and undergo several important changes.



There are some animals that live on vegetable food, and some on animal food. The former are herbivorous animals, and the latter carnivorous. Man is capable of subsisting on either sort of food, and hence is termed an omnivorous animal. There is a remarkable difference, in the construction, or organization of animals, that feed on different kinds of aliment, and there is an evident relation between the conformation of the digestive apparatus, and the food on which animals are nourished. Graminivorous animals have broad flat grinding teeth, a very long alimentary canal, and a very large stomach, or several stomachs. They have also hoofed feet. Carnivorous animals have sharp conical teeth, that cut like scissors, for dividing their prey. They have an acute sense of smell, and their feet are armed with claws. Man holds a middle place between carnivorous and graminivorous animals, and unites, in some measure, the characters of both. The structure of his teeth, the movement of his jaw, and the organization of his alimentary canal, all clearly prove, that he was intended to live both on animal and vegetable substances. Man alone is omnivorous, and is qualified to live and extend his race and his dominion in every country, where the materials of subsistence can be obtained. The movement of the under-jaw merits particular attention, as it is a good index to the kind of food, that animals live upon. If it have a vertical motion only, the animal lives chiefly, if not altogether, on animal food, but, if it admit both of a vertical and horizontal motion, we may conclude, that the animal lives on vegetable food, and between these extremes are intermediate gradations, showing that animals live on animal and vegetable substances. The monkey forms a link in the chain. Its teeth approach near est in structure to those of man. They seem adapted to a mixed kind of food, but more especially to esculent fruits.

The bill of birds may be considered as supplying, in some measure, the place of teeth. Its different

form and structure indicate the habits, and general character of these animals. The hawk and owl, have a very hooked bill, furnished with a process on each side, calculated for seizing, and lacerating their prey. Those of the parrot kind have also a hard bill, for bruising the firmer vegetable fruits, and the woodpecker, nuthach, &c., for penetrating the bark of trees. Those birds, that feed on insects, or on grain, have pointed bills to pick up minute objects. Those which take a softer kind of food, and which require a sense of feeling, as the duck, snipe, woodcock, &c., have it approaching to the softness of the skin. Aquatic birds have generally flattened bills, by which they can best select their food among the sand, mud, or weeds, at the bottom of the water; their edges are frequently serrated, to allow the fluid to filter through, while the solid, and nutritious parts, are retained in the mouth.

The digestive organs are exceedingly various in the different classes and orders of animals. To give a description of their endless variations, would be incompatible with the limits of the present lecture. As we descend in the scale from man to zoophites, the more important organs become much simpler. The only general and universal organ of digestion is the intestinal canal. Its differences are very numerous, but it is found in all animals. Animal food, it appears, is easier of digestion than vegetable food. All animals that live on vegetables, have more complicated digestive organs, than carnivorous animals. This is universally the case with mammalia, birds, fishes, and also insects. Ruminating animals have generally four stomachs. Carnivorous animals have a much shorter and less capacious intestinal canal than graminivorous animals. In omnivorous animals, the length of the canal holds a middle rank. Its length, in the human subject, is, in general, about five or six times that of the body. In a sheep, it measures about thirty times the length of the body. In animals that feed on flesh, the whole canal,



when compared to the body, is only three or five to one.

Birds which feed on grain have two cavities. The one has been compared to the grind-stones, and the other to the hopper. The gizzard of a fowl is a very powerful instrument. It has been found to break glass, and the points of needles and lancets, without being injured, and even to flatten a tube, which, according to Reaumur, required a pressure of 400lb, but as the gizzard made both the pressure and the resistance, the pressure was equal to 800lb. Stones or small pebbles are generally found in gizzards. They are supposed to have been swallowed to assist in grinding the food. Some fishes have a stomach resembling the gizzard. Some of them also swallow stones, which enable them to break down shell-fish. Eagles and pigeons have a crop which serves as a reservoir for food, and is capable of containing between thirty and forty ounces. Their proper digesting stomach will not contain more than two or three ounces. Insects that feed on vegetables, such as the white-ant and grasshopper, have a complicated canal, while those that suck blood have a very simple one.

The solid materials of the food are taken into the mouth, moistened with saliva, and masticated. They then pass into the stomach, in which they undergo a very great change. The principal causes of this change, are, the peculiar action of the gastric juice, the muscular action of the stomach, the animal heat, and the action of the nervous system. Of all these, the gastric juice is the most powerful and most remarkable agent. This juice is secreted by the stomach, mixes very rapidly with the food, and digests and assimilates it. And, considering the great variety of substances, both animal and vegetable, taken into the stomach, it is extraordinary, that the gastric juice should possess the power of assimilating them.

It is probable, that the gastric juice is different in different classes of animals. Dr. Stevens, who performed several experiments on this fluid, found, that

when he gave to oxen and sheep perforated silver balls filled with animal substances, these substances were not dissolved, but when the balls were filled with grass it was consumed. In herbivorous animals, the gastric juice dissolves vegetables only. In carnivorous animals, its operation is confined entirely to animal substances. In omnivorous animals, its solvent power is equally effectual, both on animal and vegetable substances. It is a very remarkable circumstance, that the gastric juice operates as powerfully upon the animal fibre out of the body, as within the stomach of a living animal. Sometimes it has been observed to dissolve the stomach itself, after death, especially in carnivorous animals, that die suddenly, and in a state of vigour. The gastric juice also possesses the property of retarding putrifaction, in substances where that process has begun. It will even restore the sweetness of animal matter which has become putrid.

The food having undergone the change in the stomach is called chyme, and is a pulpy mass of a homogenious nature. It passes from the stomach into the duodenum, and is there mixed with a fluid of a greenish colour and bitter taste, secreted by the liver, and called the bile, and also a fluid from the pancreas or sweetbread, called the pancreatic juice. It is then converted into chyle, a fluid of a milky appearance, which is pure and nutritious. The chyle is absorbed by the mouths of the lacteals, which are numerous small vessels, that open on the internal surface of the alimentary canal, and convey this nutritious fluid into the circulation. Hence the supply of the material which nourishes the body. The lacteals unite together, and terminate in one common trunk, about the size of a crow-quill, named the thoracic duct, which runs up the chest in a waving direction, near the spine, and after receiving numerous lymphatics on its passage, conveys the different streams of nutritious fluid into the veins of the left side of the neck. This fluid is now mixed with the blood, and flows to the heart, the great



fountain of life, and undergoes in the lungs what has been called sanguification, or is converted into circulating blood. It is there rendered fit for the growth and nourishment of the body, and is afterwards perpetually circulated, in hundreds and thousands of channels, throughout every part of the system.

We shall next consider the circulation of the blood, which was first discovered by our countryman Harvey. This process, upon which life more immediately depends, is performed by the vascular system, which consists of the heart, arteries, and veins. Before the time of Harvey, the blood was believed to be formed in the liver, and sent out from it during the day along the veins to nourish the body, and returned by night. The arteries were supposed to carry air or vital spirits, to animate the system, by mixing with the blood. The doctrine of Harvey, which at last prevailed, I shall now explain to you. The blood containing nutritious fluid is brought by the veins to the heart, which is situated within the chest, and which contracts and propels the blood through the arteries to the remotest part of the body, from whence it is returned by the veins. Before the blood passes through the arteries to the body, it is exposed to the action of the atmospheric air in the lungs, where the nutritious fluid is assimilated, and the blood purified and rendered fit for sustaining life.

I shall proceed first to describe to you in a more particular manner the apparatus employed in the circulation. The heart is the chief agent in this process. The human heart is a hollow muscle of a conical form, having some resemblance in shape to half a sugar-loaf. In size, it is about equal to the fist of the subject. It is divided into four cavities, and is inclosed in the pericardium. It is situated in the left side of the chest, or rather lies obliquely across the chest, with its point to the left side. Two of the cavities of the heart are called auricles, and two are

called ventricles. The auricles receive the blood from the veins and convey it to the ventricles. The ventricles contract and propel the blood into two large pipes, the one leading to the lungs, and the other to the rest of the system. These pipes or vessels are called arteries. During the circulation the auricles and arteries are acting in concert, and the ventricles and veins are also acting in concert, contracting and dilating at the same time.

There are two sets of vessels or canals employed in the circulation—arteries and veins. By means of the arteries the blood is carried from the heart to every part of the body. The action of the arteries is called the pulse, and corresponds with the action of the heart. The arteries are pulsating canals. They are very numerous, and rather more than a hundred have received names. The veins are long membranous canals, that do not pulsate. They return the blood from every part of the body to the heart. They are still more numerous than the arteries, often accompany them, and are described by nearly similar names. Most of the veins are furnished with a number of valves, to assist them in conveying the blood.

The human heart is double, consisting of two distinct hearts, each having two cavities, an auricle, and a ventricle. One of these hearts propels the blood through the lungs, and the other propels it through the general system. The blood in the former is of a dark purple colour, that in the latter is of a brilliant red colour. The difference of colour is owing to the action of the atmosphere upon the blood, during respiration. It depends on a chemical change. There is the same difference of colour of the blood contained in the arteries and veins of the body. The blood in the arteries is of a vivid vermilion hue, that in the veins is of a dark purple colour.



The ventricles may be considered as the most essential part of the heart, and may be compared to a forcing machine. The auricles are reservoirs, or receiving cavities, to receive the blood from the veins. The blood is brought to the right auricle of the heart from every part of the body, by the veins. This auricle contracts, and throws the blood into the right ventricle. The right ventricle then contracts, and propels the blood into the pulmonary artery, which conveys it through the lungs, to undergo the action of the air in respiration. Four veins bring the blood back to the heart, and empty it into the left auricle, which contracts, and propels it into the left ventricle, from whence it is sent into the aorta, and is distributed, by means of the arteries, over the body; to impart nourishment, growth, and strength, to the general system. Valves are placed between the auricles and ventricles, and at the mouths of the pulmonary artery and aorta, to give the current of blood a particular course. These valves yield before the stream of blood, when it flows forward, but are raised to prevent it regurgitating, or returning backwards.

The heart is a very powerful muscle, and in general contracts about 4000 times in an hour. Each ventricle will contain about an ounce of blood, so that 4000 ounces of blood, or 250lb. of blood pass through the heart every hour. The velocity of the blood leaving the heart was calculated by Hales at 149$\frac{7}{9}$ feet per minute. The exact quantity of blood contained in the human body has not yet been ascertained, but it has been calculated that the mass of blood is about 25lb., and a quantity equal to this passes through the heart every six minutes, or ten times in an hour. It is probable that the quantity of blood is different in different persons, and that it may vary in quantity in the same person, at different times. It is generally supposed that young persons have more blood than old, and that fat persons have less than lean. The veins

are more numerous, and contain more blood, than the arteries. About 1–4th of the blood is thought to be in the arteries, and 3–4ths in the veins.

In those animals that have no vertebræ, as the lobster and shrimp, the blood is white or colourless. In the grasshopper it is of a green hue. In man, and in animals that have vertebræ, it is generally of a red colour. In some animals, as reptiles and fishes, the blood is cold, and they are called cold-blooded animals. In birds and quadrupeds it is hot, and they are hence called warm-blooded animals.

Though the heart is the principal agent in the circulation of the blood, it is not essentially necessary to this process. There are some animals that are not provided with a heart, and in those that usually have one, there are instances in which it has been wanting, yet the circulation has been carried on without it, and the animal well nourished. No part of the body of animals exhibits so much variety as the heart. It varies in form, size, and structure, in different classes of animals, yet it is always well adapted to the purpose for which it is intended, and "in nothing," as it has been justly observed, "is the wisdom of the Creator more gloriously seen than in the heart." In mammalia and birds, the heart is very similar in appearance to that of man. Serpents, lizards, and tortoises, have a heart consisting of three cavities, two auricles and a ventricle. Fishes have only two cavities of the heart, one auricle, and one ventricle. Lobsters, crabs, and shrimps, have only one cavity or ventricle. Many forms of being have circulating vessels, but have no heart. Thus we find in this, as in the other departments of the economy of nature, a regular gradation of organs, decreasing in complexity as we descend from the higher to the lower orders of animals.

There are some vulgar errors respecting the structure and situation of the heart. Many persons believe



that there is a bone in the heart. In some old persons, and in persons with a diseased heart, there is a bony substance at the base of the heart, but in a healthy and sound heart there is no such thing. The stag and the hog are the only exceptions. They have each two flat bones at the origin of the aorta. Some have supposed that a large heart begets courage, and a small one irresolution and fear, and they speak, though perhaps figuratively, of a little or big heart;—they say, his courage was as big as his heart. This is a great error: any considerable deviation from the ordinary size of the heart is the effect of either malformation or disease. If you ask some persons where the heart is seated, they will perhaps point to the situation of the stomach, or to the right side, and they will also tell you, what is equally absurd, that the blood in the king is different from that in the peasant. You are now aware that the heart lies across the chest, with its point to the left side; and you have higher authority than mine for believing that "all nations of men are made of one blood, for to dwell on all the face of the earth."

The capillary, or smallest branches of the arteries, are continued into other small capillary branches which convey the blood back to the heart. The latter set of vessels, the veins, unite again and again and form larger vessels, till at last, they form two common trunks which convey the blood from all the upper and lower parts of the body, and meet, and discharge their contents into the right side of the heart. All the arteries, however, are not continued into the veins. Many of them break off from the course of circulation and terminate in a different manner. Some of them empty themselves into bones, some into muscles, some into ligaments, some into nerves, and some into the other parts of the body; and by a vital process called assimilation, their contents are converted into these several substances. Several of these capillary vessels convey their contents into the cavities of the body, and into the glands, which change the nature of these contents, and convert them into

fluids of a different quality. These I shall point out to you, more particularly, when we treat of the subject of secretion.

There is another set of vessels which are called lymphatics, from the clear and watery appearance of the fluid they contain. These are still more numerous than the veins, and like them, are furnished with valves. They arise from every part of the body, branch out like the veins, and empty their contents into the veins, a little before the latter enter the heart. Some of them, that pass through glands, terminate in veins, in their own neighbourhood. Some of them convey the nutritious particles of the food to the general mass of circulating fluids; these are called lacteals. The lymphatics absorb the fluids, and prevent them accumulating in a healthy state of the body; they carry off the decayed parts of the body, and conduct them back to the mass of blood. But the decayed parts cannot be retained there. They must be thrown out of the system by some means or other. For this purpose, we find that some vessels open upon the skin, some on the internal surface of the lungs, some into the kidneys, and some into the intestines. All the decayed parts o the body, and all that part of the food which is useless are evacuated by these outlets. Besides, by the action of the absorbents, many substances, probably, enter the circulation by a capillary attraction, or imbibition. Absorbing or lymphatic vessels have been found in all vertebrate animals, but in the inferior tribes, no absorbent system has yet been demonstrated.

We have traced the course of the aliment from the mouth to the stomach and intestines, and from thence to the circulating system, through the lacteals and thoracic duct. We have next to consider the change produced upon the blood and the nutritious fluid by respiration. The circulation of the blood and respiration have a mutual dependence upon each other. The former cannot take place without the latter.



Respiration may be defined, the alternate entrance and egress of air in the lungs, and it is by this process that the blood is exposed to the influence of the air. In man, we observed that the heart was double,—there was one heart to circulate the blood through the lungs, and another to circulate it through the general system. The lungs are the principal organs of respiration: they are the great reservoirs of air: they occupy the greatest portion of the chest, which expands to receive the air, and contracts to expel it. The lungs correspond with the chest in figure, are spongy bodies, and consist chiefly of air cells. These cells are very small, irregular in their form, and very numerous. They communicate freely with each other, and do not exceed 1-100th part of an inch in diameter. Their internal surface is very extensive. The second Monro calculated it to be 30 times greater than that of the whole external surface of the body, and to be nearly equal to 440 square feet.

The pulmonary artery conveys the blood from the right ventricle into the lungs, where it divides into two equal branches, and these are afterwards subdivided into innumerable small branches, and are distributed, like a net work, over the cells of the lungs. The whole mass of blood passes through the lungs, and undergoes a remarkable change. It is changed from a dark red colour, to a bright scarlet, and is rendered fit for the purposes of the animal economy.

In the fœtus, or infant before birth, there is a communication called the foramen ovale, between the two auricles of the heart, and as the child, at this time, does not breathe, the blood can undergo no change in the lungs. We accordingly find, that the mass of blood does not circulate through the lungs, as in the adult, but passes direct, from one side of the heart to the other, through the foramen ovale. In some persons this communication remains open after birth, and, in them, the skin is colder than usual, and is of a dark

purple or blue colour. These persons have difficult digestion, and never enjoy good health. The very fatal complaint which lately visited this country, had a very remarkable symptom—the blue colour of the skin, and was hence often called the blue cholera. From various experiments performed in Germany, upon the expired air of Cholera patients, it appears, that the quantity of carbonic acid expired by them, is not more than about a quarter of that which is expired by healthy persons, and hence probably the blue colour of the skin.

Before entering more fully upon the subject of respiration, it is necessary that we should extend our enquiries into the nature and constitution of the atmosphere. The atmosphere is that elastic and invisible fluid with which this globe is surrounded. It was regarded by the ancient philosophers as an element or simple substance. Modern chemists have discovered, that it is a compound, consisting of two æriform bodies, oxygen gas, and nitrogen gas, with which are mixed a small portion of carbonic acid gas, and watery vapour.

The proportion of oxygen and nitrogen in the atmosphere, has been differently estimated by different chemists. The proportions considered the most accurate are 21 of oxygen gas, and 79 of nitrogen gas by measure, or 23 of the former to 77 of the latter by weight. The quantity of carbonic acid gas is so small, that it is not easy to estimate it. Dr. Dalton has inferred from experiments that it does not exceed a thousandth part by weight.

During respiration the composition of the atmosphere undergoes a considerable change. When we inspire, the atmosphere rushes into the lungs through the trachea or wind-pipe. In expiration, the air is expelled from the lungs, and when this air is examined it is found to be very different from that of the atmosphere. It contains less oxygen gas, and a much greater proportion of carbonic acid gas. The quantity of carbonic acid varies as respiration is slowly or quickly performed. In natural respiration, the chest dilates and contracts, in adults, about eighteen times a minute, and the quantity of carbonic acid gas produced is about 32 cubic inches in that time. The quantity af air taken in, at each respiration, is calculated at an average about 40 cubic inches. The oxygen of the air is consumed, and a portion of carbonic acid gas is formed. According to some chemists, the quantity of one is equivalent to the other. In an individual of ordinary size and health, about 12oz. of carbon are discharged from the lungs in 24 hours. During respiration, the oxygen of the air acts upon an extensive surface of blood circulating through the lungs, and abstracts a portion of carbon forming carbonic acid. This action occasions the blood to assume a bright vermilion colour, or it is converted into the arterial state. In venous blood, there is a redundance of carbon or charcoal, which gives rise to the dark purple colour. Respiration removes from the system this noxious principle. When the oxygen of the air, combines with the carbon of the blood, and forms carbonic acid, caloric, or heat, is evolved, and hence the source of animal heat, or that uniform temperature which animals possess and preserve, superior to the temperature of the medium in which they live. The blood, being changed from venous to arterial, acquires a greater capacity for heat, and takes up the heat, or caloric, that has been extricated by the combination of carbon and oxygen, so that there is no increase of temperature in the lungs. In the circulation through the body, the blood is changed into venous, and its capacity for caloric diminishes as much as it had been increased before in the lungs. The quantity of caloric or heat, that had been absorbed, is given out in the extreme vessels, over the whole body, and gives rise to animal heat. This is a simple and very plausible theory.

Connected with the organs of respiration, are the organs of voice or speech, the chief of which are the lips, the tongue, and the larynx. These are very complicated, and are more so in man than in most other animals. Man also excels all other animals in possessing the power of speech, and an articulate language.

The organs of respiration differ much in different animals. In quadrupeds, the lungs have considerable resemblance to those of man. In birds, the larynx is double, and the trachea or wind-pipe is differently formed in different kinds of birds. It has one formation in swimming birds, another in diving and wading birds, and another in singing birds. The lungs differ from those of man in several circumstances. They are firmer, occupy but a small part of the chest, and are not divided into lobes. The air cells communicate with the cavities in the middle of the long bones. The distension of the air cells renders birds more buoyant in the air, and lighter in flying. It also lessens the necessity of inspiring frequently, in long and rapid flights, and in singing or swimming. In reptiles, the lungs vary much in their shape, and size, but approach more in their structure to the lungs of birds. Fishes, instead of lungs, have gills placed behind the head, and communicating with the throat. They derive oxygen from water, as breathing animals do from air. Water is received by the mouth, is sent to the gills, and is afterwards discharged by the branchial openings. Fishes do not expire by the same passage by which they inspire. The slug and snail have a cavity in the neck which supplies the place of a lung. In the crustacea, the lungs are nearly of the same nature as the gills of fishes. In shrimps, they lie under the tail, between the fins, and float loosely in the water. Insects have no cellular lungs, their respiration is performed by tracheæ, or tubes, which carry air through all parts of their system. In the zoophytes respiration



is carried on externally. It is supposed to be performed by the external surface, the same as in vegetables, but this has not yet been fully ascertained.

The last of the vital functions I named, was secretion, or that function by which an organ forms or separates a fluid from the blood that does not exist in it. All the products of secretion possess specific properties. They differ widely from each other, and serve very different purposes. Some of them are necessary to the performance of the various functions of the animal economy, and others are discharged as hurtful or useless.

The internal cavities of the body are lubricated with a serous fluid, which is secreted by the peculiar action of the membrane that lines them. There is a mucous secretion through the whole course of the intestinal canal. All the joints are lubricated with a viscous or mucilaginous secretion, called synovia, or joint oil, to facilitate their movements. From the skin the perspiration is secreted. The liver secretes bile; the pancreas or sweet-bread, the pancreatic juice. The kidneys secrete urine, and the breasts milk. The stomach secretes the gastric juice. The lachrymal glands secrete tears, and the salivary glands saliva. There are several other secretory organs, each elaborating a fluid possessing characteristic properties. In the human body there are about twenty different fluids secreted.

The secretions of the lower animals are very numerous, and very various. Some animals secrete a nutritious aliment, and some a deadly poison. Some secrete fine perfumes, and others valuable medicines. Some supply the necessaries of life, and some its luxuries. Milk, a useful and nutritious fluid, is secreted by many animals. Castor is secreted by an animal called the beaver. Musk, a very fine perfume, is secreted by the musk animal. The well-known substance called honey

is the produce of the bee. The same insect secretes a venom or poison: you are all aware of the sting of the bee. Silk is secreted by the silk worm. Vipers and certain venomous serpents secrete deadly poisons. The cuttle fish secretes a black inky fluid, with which it colours the water to enable it to elude the pursuit of its enemies. This black fluid is supposed to be the basis of indian ink. Air is secreted in the swimming bladder of fishes, by which they alter their specific gravity, so that they can rise nearer to the surface of the water, or sink deeper, at their pleasure. But the most wonderful secretion is perhaps the electrical matter secreted by certain fishes, as the torpedo, and electrical eel; which enables them not only to terrify, but to paralyse their enemies.

To comprehend all the functions of the animal system is above our limited power. It is an attainment far beyond our hopes or expectations. For the meanest creature exhibits very remarkable phenomena, and is indeed, "a collection of wonders." The greatest mystery in the economy of animals is the function of reproduction, or that by which the species is continued. It constitutes one of the grand characters that distinguish the machines that are made by the Almighty, from those that are made by man. It also distinguishes minerals and fossils from living beings, as the former never produce their like. Plants, in common with animals, possess this power;—and the duration of their lives is equally different. Some plants live only a few hours, some a few days, while others live for several centuries,—some are even supposed to live many thousand years. Myriads of small insects exist only one hour, others half that time, many only a day, and many live a summer; while other animals, that rank higher on the scale, live above a hundred years.

As all living bodies have a limited existence, Providence has wisely made a provision for the continuation of the species. All living organised bodies are produced by organised bodies similar to themselves. The highest class of animals are viviparous, and suckle their young, from which circumstance they have received the name of mammalia. Birds, many reptiles, and insects, the crustacea, Mollusca, and worms, are oviparous. Fishes, and some other animals, are also oviparous. Insects undergo transformations. They pass through certain intermediate states of existence. From the egg proceeds the larva or caterpillar, which changes to the chrysalis or aurelia, and afterwards assumes the last or perfect form of a winged insect. In the lowest tribes of animals, the monads for example, the species is continued by portions of their bodies being detached; and polypi may be divided into a great many parts, and each part is capable of living, and is a perfect and sensitive animal. These animals belong to the class of zoophytes, which forms the connecting link between the animal and vegetable kingdoms. They resemble vegetables in their external structure, and in their mode of reproduction, but are real animals.



There is another remarkable power of reproduction with which animals and vegetables are endowed: it is that of restoring or renewing parts that have been mutilated or lost. Man possesses this property in a very limited degree; but several cold-blooded animals, as the water-newt, earth-worm, lobster, have it in astonishing perfection. Wounds are healed, and fractures united by this power. Sometimes the large bone of the human leg will die of disease, and a new one occupy its place, and the person affected will be able to walk all the time. A new head will grow on many of the vermes, and a new tail on the lizard, after the old ones have been struck off. If the first phalanx in the large claw of a lobster, or cray-fish, be broken or destroyed, the remainder of the claw will drop off at the fourth joint, and a new and entire limb, like the

former, will be produced. The whole head of the snail, with its four horns, has been observed to be renewed in about six months. The eye of a large water-newt has been extirpated, and in the course of ten months a new eye formed. There is a worm met with in the human body that will live a long time after it has been broken into pieces, and if the head be left after the rest of the worm has been voided, a fresh worm will be formed.

At different seasons of the year, several organized beings lose certain parts of their body, which are afterwards renewed by a natural and spontaneous process. Stags have their horns reproduced, horses their hair, birds their feathers, serpents and the larvæ of insects their cuticle, and the shell-fish their shells.

In the general view we have just taken of all the different organs of the body, we have seen how the bones are united by articulations or joints, how they are connected by ligaments, and moved by muscles, and how they derive their energy from the nerves. We have seen also how every organ is nourished, how the blood is circulated, and how the useless and decayed parts are ejected from the system. We have now to examine the package and covering of the different parts.

All the organs in the human body are surrounded and connected together by thin webs, of a whitish colour, called membranes, which afford them protection and security. They are wrapped up and packed in a very surprising manner. Though extremely delicate and constantly in action, they are so arranged and secured as not to incommode or injure one another.

From external injuries the body is protected by its integuments, which consist of four layers. The first is a thin covering called the cuticle, or scarf skin. The nails form a part of this covering. The next is called



the rete mucosum, being of a soft mucous nature. It is situated under the cuticle, and gives colour to the skin. Beneath them is the true skin, which is a white and strong membrane, largely supplied with blood-vessels and nerves. In this membrane is situated the sense of feeling. Beneath all these is the cellular membrane which penetrates every part of the body, and appears to contain all the organs in its cells. It connects them together, obviates pressure, and preserves symmetry.

The integuments are extremely various in different animals. The cellular membrane is found in all animals. In some, as the medusa, it constitutes the principal part of the body. In a few animals the cuticle is of a scaly structure, as in the scaly lizard and the armadillo, the tail of the beaver, rat, and some of the monkey tribe. In reptiles and serpents the cuticle is cast off periodically, in fishes also it falls off at certain periods of the year. Horns, hoofs, and claws resemble the nails in man, and the hair, wool, furs, and feathers are analogous to the human hair.

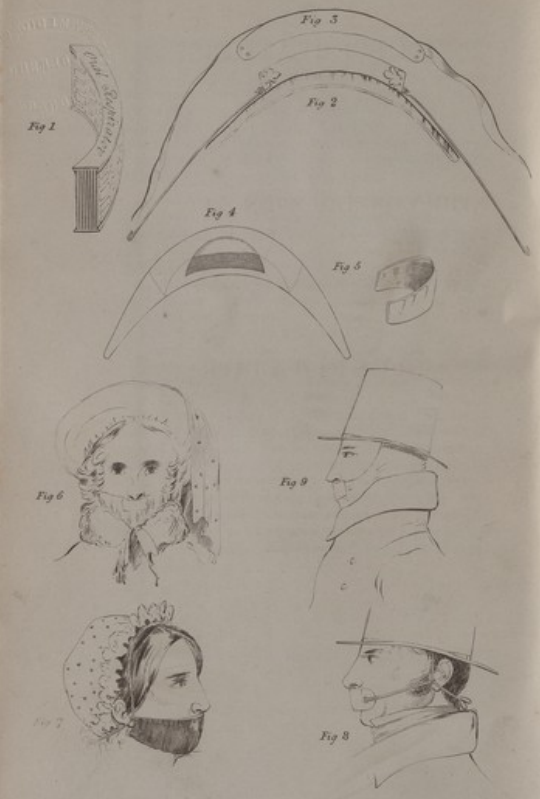
Besides the integuments that are common to man and the lower animals, many of the latter have a thin muscle called the fleshy pannicle, by which they regulate the motions of the integuments. The hedge-hog and armadilloes coil up their bodies, and resist the attacks of their enemies by means of this muscular apparatus. Many birds, as the cockatoo, heron, turkey, and goose, have the power of moving the feathers of their crest, neck, or tail, at pleasure.

The cellular membrane in several animals contains a large quantity of fat. In seals and walruses the fat is nearly fluid. In animals that pass the winter in a state of torpor, as marmots and dormice, the fat is accumulated in numerous large cells in summer; and while they are in a torpid state, it is absorbed, and supplies their bodies with nourishment.

Between animals that rank lowest on the scale, and vegetables, there is in some respect a great similarity. Many animalcules, like the seeds of vegetables, may be kept in a dry state for many years, and may be restored to life by being moistened with water. Some animalcules may be reduced to perfect dryness, and it is asserted that they may remain for years in a state of fine powder or dust, and may be revived in a few minutes by being supplied with water.

We have now taken a concise but general survey of the earth, and of all the objects connected with it, both animate and inanimate. We have taken a more particular view of the animal creation. I have given you a brief and imperfect description of the structure and physiology of the human body, and a comparative view of the several organs and functions of some of the lower animals. We have seen that there is a gradation, or scale of animal existence, that man is placed at the head or top of the scale, that the structure of his body is the most perfect, that while some animals live on animal food, and some on vegetable food, he lives on all kinds of food, and that he alone walks erect. We have also found that he is endowed with intellectual faculties, and the power of speech, which exalt him far above the brute creation. Man has also a sense of gratitude and of religion: he alone looks forward to futurity. How grateful, therefore, ought he to be to the Author of his being, who has bestowed upon him these and all other blessings! And how much must he admire and adore the wisdom, power, and goodness of the Almighty,—the Creator of all things!

J. STEEL, PRINTER, PEASCOD'S LANE, CARLISLE.




# OBSERVATIONS

UPON

# THE CONSTRUCTION AND USE

OF THE

# RESPIRATOR;

AN INSTRUMENT FOR FACILITATING THE RESPIRATION OF PERSONS SUFFERING UNDER PULMONARY AND BRONCHIAL AFFECTIONS, BY WARMING THE AIR INSPIRED, AND THEREBY ENABLING THEM TO BREATHE FREELY IN THE COLDEST ATMOSPHERE.

LONDON:
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15, CROSS STREET, HATTON GARDEN.

1836.

# OBSERVATIONS, &c.

The prevalence and fatality of diseases of the lungs in this climate, render every method of relieving them worthy of the attention of the physician. For success in our efforts towards this great object, it is necessary that their causes should be ever kept in view. Among the most influential, are those which act through the atmosphere we dwell in; such are its impurities,—its state as to drought and moisture, and as to heat and cold. It is well known that ordinary miasms, however injurious to the lungs indirectly, have less direct effect upon them, excepting in asthmatic cases, than might have been expected from their immediate contact with the lungs in respiration. Impure air, if warm, is often less injurious than the purest cold air.

The thermometric state of the air is, doubtless, that which has most influence over the action of the lungs. Experience has shewn that sudden changes*, and a low temperature, are the most frequent of all the causes of pulmonary disorder. In England, during the greater part of the year, the body is

* The far greater frequency of pulmonary consumption in England, than either in tropical climates, or, it is said, in the arctic regions, would tend to shew that it is the sudden change, so frequent in our climate, from warm to cold weather, and the sudden change from warm apartments to cold air out of doors, rather than any thermometric *extremes*, which are most injurious. It is still, however, the cold which is the cause of the mischief; though, as in the case of many other irritants, a little of it applied suddenly, and at intervals, may have much more effect than a greater degree, acting gradually and steadily. Because, on this account, some climates, colder than England, may not excite disease so frequently in the lungs, it would be absurd to conclude against the experience of every day,—against the feelings of every sufferer,—that cold air in England is not mainly contributable to pulmonary disease; yet there are persons to be met with who draw this conclusion, and that, too, in the medical profession!

exposed to sudden, if not extreme cold, since people are frequently passing from warm apartments into the cold air, either in passages or out of doors.

It is plain, that cold air can act upon the body through two channels only,—namely, by the surface of the body, and the lungs. The surface may be, and is by all prudent persons who have the means, well guarded against cold; but hitherto the lungs and throat have been unprotected, or screened in some way injurious to respiration.

The action of cold air upon the lungs is twofold. First, it proves *directly* irritating to the windpipe and air vessels, exciting the lungs of the invalid to that one of the numerous diseases of the lungs to which he is predisposed.—Secondly, cold air acts *indirectly* in a manner scarcely less injurious. Owing to the uneasiness which it occasions, the chest refuses to receive any more cold air than will barely suffice to support life, or than can be deprived of its chill in the mouth or nostrils. How many persons are there whose respiration is sufficiently free in the summer, but who are compelled to live upon a short, panting kind of breathing throughout the winter, during which time the lungs are never properly inflated, or if inflated it is by vitiated air; the air being very slowly changed where the inspirations are so short. However gradual in some cases, the certain consequence of this imperfect respiration must in time be a change in the structure of the lungs, independently of alterations of structure from other causes. They will lose much of their spongy texture. Some of their finer passages and cells will become obliterated by condensation and adhesions,—the natural consequence of want of use and irritation. The chief benefit of inhaling warm vapour arises, as the physician knows, more from the mechanical expansion the lungs are thereby subjected to, than from any medicinal action of the substances inhaled. All sufferers are familiar with the *direct* irritation



of cold air; but this *indirect* effect is little observed except by the physician. It is a fact daily to be lamented, that transcendent as is the medical skill at command in England, it is often unavailing, owing to the constant opposition of so powerful a cause of disease as cold air applied at each inspiration to the passages and to the lungs. Could this cause be removed but for a time, many a patient would be enabled to appreciate aright the skill which had discovered the peculiar disease supervening, and which has now afforded an opportunity for the undisturbed operation of its remedies.

In considering cold as the grand atmospheric irritant, we must not overlook the injurious effects of dryness of the atmosphere, when combined with cold, in many affections of the lungs. A portion of the benefit of inhaling vapour is due to its humidity, as well as its warmth; and consumptive persons in general derive benefit from a moderately humid as well as a temperate atmosphere.

The above is an outline of the reflections which led to the construction of the RESPIRATOR, an instrument which, it is hoped, will prove of much use in affections of the lungs, by effectually guarding them against the action of cold. In searching after all means at command for effecting this object,—although the lungs cannot be clothed like the surface of the body, nor a stock of warm air carried about by a person,—a source of warmth presented itself, abundant in amount if the heat could be caught, and the rightful property of the lungs, inasmuch as it is generated by the lungs themselves. The lungs are continually giving out the warmth which might save them from destruction, but to no purpose, for it is carried out in the breath, and lost in the air around. The air which issues forth at each expiration, contains more heat than enough to warm the following inspired air. To transfer the warmth from the former to the latter became the grand desideratum, for which object some instrument was required. To do it successfully, this instrument had

to be worn on the face, to catch with rapidity all or nearly all the heat of the breath as it issues forth, to store this heat up, and deliver it to the fresh air next drawn in, in order that it might enter the mouth or nostrils comfortably warm.

While these positive properties were necessary in the instrument, it had to possess, also, certain negative ones, without which it could not be employed. In the first place, while drawing from the air its heat, the instrument must not, in any appreciable degree, impede the exit of the air; and in giving heat to the returning current, it must not obstruct its entrance: respiration, in short, must not be rendered at all more laborious. In the next place,—if possible, the vibrations of the air, which constitute sound, must not be checked, for the instrument ought not to obstruct the voice in speech. Again, it must not be of any larger size than can be made to answer the purpose, since it has to be worn on the face. Lastly, it must be very simple, durable, easily employed, and moderate in price. Some nicety of construction was requisite for combining successfully so opposite properties in a small and simple instrument.

The following deductions from the known properties of matter afforded data upon which it was easy to proceed with confidence of a successful result.

In the first place, the lightness of air is such, that sixteen grains may be taken as the full weight of the air of each respiration. Secondly—The capacity of air for heat is small, so that any substance which is to take up the heat of temperature of sixteen or twenty grains of warm air, need not itself weigh much. Thirdly—Though air is a bad conductor of heat, its ready divisibility affords a way of exposing simultaneously all its parts to the action of the substance which is to conduct off its heat. Fourthly—Its mobility and elasticity, together with this divisibility, are so complete, that they enable it to pass readily through very small apertures, if these apertures are not long or tubular; and as these



apertures (for the purpose of the third indication, *i. e.* for rapid conduction), must be very numerous, the motion need not be perceptibly obstructed. There may even be many layers of the conducting substance, provided the layers be very thin. Fifthly—Not only may the ready passage of the air be thus secured, but even those minute vibrations in it, which constitute the voice, may be preserved, if the conducting substance it traverses be metallic. Air will not have its most delicate vibrations disturbed by passing through well-stretched metallic layers, however small the apertures. Whereas by plates or threads of fibrous substances, as paper or parchment, which become relaxed and then vibrate irregularly to the vocal sounds, the voice is deadened. Sixthly—As for the vocal effect the conducting substance ought to be metallic, so does the main principle of its action require that the despository of the heat should be formed of matter of the best conducting power. Hence, on this account, also, it must be of metal. The two indications are thus in happy accordance; and the precious metals, as possessing a high conducting power, and being incorrodible, have been employed. Seventhly—Since the temperature of any one substance must be lower than that of any other before it can receive heat from the latter by conduction, it is plain that a single layer of metal could only take a part of the heat from the breath; even if the contact were of longer duration than it is, the breath would lose no heat after it had raised the metal up to its own temperature. In order to extract more heat from the breath, it must be carried through another layer of metal, which being much colder than itself, can abstract heat from it. As the breath and this second layer approach towards the same temperature, this second layer will not be able to abstract more heat from the breath. It must, therefore, pass through a third still cooler layer, and, for the same reason, through several. In practice, six or eight will not prove too many, and in the coldest weather double that number may

be employed. In this series of laminæ, each is warmer than the one in front of it, from the exterior one, which is nearly of the temperature of the atmosphere, to the innermost one, which is perhaps within ten or fifteen degrees of the temperature of the breath. These laminæ would not remain one instant of time at so different states as to heat, if they were placed in contact with each other. In order to preserve the progressive difference in their stocks of heat, they must be kept apart; and it will be found, that during the short period of one respiration, a very small separation will suffice for the purpose. An interval for each of one fortieth of an inch, including the metal, is more than enough; six or eight layers may therefore lie in one eighth of an inch. These layers having been warmed during an act of expiration, and being each warmer and warmer as they lie nearer the mouth, are enabled to give heat in the most advantageous manner to the fresh air entering from without, which takes up a parcel of heat in traversing each; since, although it grows more and more warm, it is sure to find every layer it comes to warmer than itself, which is, of course, a relative condition necessary for the communication of heat to the air.

Lastly. Not only must the conducting metal be divided into distinct laminæ, that air of different grades of temperature may continue subject to its operation, but in each lamina the metal must be reduced to a state of great extenuation, and be placed in such a manner as to effect the utmost possible division of the breath, so that every particle of it almost may impinge against metal, yet that the passage of the air shall be abundantly free, in order that there may be no perceptible obstruction to the progress of the breath.

The Respirator has been constructed with minute attention to the above rules. It consists of two parts—the operative part represented by fig. 1, in the plate, and the case for holding it mounted with its silken attachments, seen in fig. 2. The former, fig. 1, consists of a packet of lattices, or small



frames of silver, kept apart by other similar lattices of a waterproof substance. These last lattices serve as imperfect conductors of heat for keeping the silver lattices apart. The silver lattices are overlaid with gold wires on both sides. The wires on those nearest the mouth are one three-hundredth of an inch thick, and one three-hundredth of an inch apart. On the outer lattices they are about one six-hundreth of an inch thick, and one six-hundredth of an inch apart. The packet, fig. 1, is made up of from four to ten of these lattices, carrying from eight to twenty layers of wire, with a non-conducting lattice between each skein. The packet is arched to suit the curvature of the mouth. It is lodged in the case, fig. 2, which it exactly fits every where but behind, next the mouth. Here there is a small space behind the packet to permit the breath to diffuse itself to every part of the back, or concave surface of the packet after it has passed from the mouth. The case is so formed as to collect any moisture condensed from the breath, and to deposit it in a strip of sponge fixed in the lower part of the case. It is only necessary to open the case and remove the packet of skeins once a day, in order that the interior of the case and the sponge may be dried with a handkerchief. Occasionally the packet itself and the sponge may be removed, and rinsed in warm water. Fig. 3, is the front cover of the case, so made as to accommodate a single or double packet behind it.

The instrument is of two kinds; one, the oral is adapted to the mouth alone; the other, which may be named the orinasal, has a communication with the nostrils, as well as the mouth, to suit the convenience of persons who have not acquired the habit of breathing chiefly through the mouth. Figs. 4, and 5, are different views of an orinasal; and figs. 6, 7, and 8, represent an oral Respirator, with light ribbon mountings, as it appears when worn on the face. Fig. 9, represents an oral Respirator mounted with a covering for

the sides of the face, to be worn by invalids and other persons who are desirous of protecting the face from cold while travelling on coaches, or in open carriages.

It is a curious fact in physics, the application of which is of much importance, that heat may be instantaneously separated from a body of air, by means which need not in a perceptible degree disturb its mechanical condition. Thus, in the present case, the Respirator draws off the warmth of the breath without any mechanical effect perceptible by the individual who may put it on, or by those whom he may be addressing in the lowest tone of voice. Both his respiration and speech are unaffected by it, while it affords a grateful warmth to the inspired air. *Now this is the chief object for which invalids suffering from pulmonic affections are sent to milder climates.* It is of great importance that the warmth it communicates should be distinguished from that of a close carriage or confined apartment, where the warmth arises from the repeated admixture of warm, stale air, vitiated by being frequently respired, with a proportion of fresh air. To avoid a respiration rendered painful and imperfect by chilling air, the sufferer has to bear one rendered laborious and unhealthy by impure though warm air. But when the Respirator is employed, the impure air from the lungs is entirely void at each expiration. The compass of the whole being trifling, it may be said, that nothing* is retained but the heat; and

* That no impure air worthy of consideration is detained by the Respirator will be obvious to every reflecting physiologist. The whole internal space of the instrument unoccupied by metal, &c., does not exceed three quarters of a cubic inch, which could not give lodgment to a larger quantity than one two-hundredth part of the vitiated air detained in the chest of every grown person at the close even of an act of ordinary expiration; or, according to the experiments of some physiologists, who state that more than two hundred cubic inches of air are detained in the lungs, the proportion of the fraction in the instrument must be even less than the two hundredth part. Where the quantity of the air in the instrument is so minute a part of the whole detained, it may be affirmed practically, that the breath is as completely voided when the instrument is on, as when it is off.



this heat, by tempering the air drawn in, permits the sufferer to breathe freely out of doors. Hence, when in bed in a cold room, or when abroad in the open air, he is enabled to expand his lungs without uneasiness, and to inhale more and purer air than he could by any means obtain without the instrument. And since it is necessary in this climate to warm our apartments, there do not appear any other means by which an invalid can guard himself against the effects of sudden vicissitudes in passing through the colder parts of a house (not to mention the outer air), than by having a Respirator at hand, which may be placed over his mouth in moving from one apartment to another.

A remarkable and important effect of the Respirator remains yet to be noticed, namely, that while it warms the air entering the chest, it also saves to the system nearly all of the heat usually carried away by the breath. It is a question, whether the heat lost in ordinary respiration may not equal in amount the heat given off from the surface of the body, in England, where, in cold weather, the conduction of heat from the surface is moderated by warm clothing; whereas in twenty-four hours about fifty-pounds weight of cold air are drawn into the lungs, and raised from a low temparature up to about 100° of Fahrenheit's scale.* Whether the heat requisite for raising fifty pounds weight of air from the freezing temperature to 100° be equal in quantity, or not, to that lost from the surface of a well clad human body in twenty-four hours, it must prove a large draught upon the calorific powers of the animal system. Now it must be evident to the physiologist, that the heat which is thus lost from the pulmonary surfaces would otherwise circulate with the blood and be diffused over the whole body. The chilly state of the surface, and the cold extremities, of invalids suffering under

* The heat lost by the evaporation of the cutaneous exhalations is a question distinct from the present, and does certainly not exceed that absorbed in the evaporation of the pulmonary exhalations.

pulmonary affections, indicate a need of such a recovery of the animal heat. The Respirator promises to effect this recovery. Of all the heat generated in the lungs, but a small part being now lost in respiration, much more of it must remain in the arterialized blood, and be conveyed in the blood to the distant parts of the body. We may then expect the Respirator, not only to make easy the respiration of the traveller, in winter who wears it, but, after a time, to diffuse also a grateful feeling of warmth over the extreme parts of his body, derived from heat, which, without the instrument, would be stolen by the breath, and cast away into the atmosphere unemployed.

The instrument has been found by all who have employed it to answer the expectations held out by the inventor in every respect. It is hoped, therefore, that it will prove of much value to the public, by affording ease to a numerous body of invalids, and comfort to travellers,—giving rest at night to many who are now disturbed by inhaling cold air, enabling others to follow without injury their vocations abroad, and many others to enjoy fresh air and exercise, at present denied to them. To the physician it promises to be equally useful, by removing a disturbing power, which too often renders unavailing his remedial measures, how judicious soever they may be.

JULIUS JEFFREYS.

Printed by J. S. Hodson, 15, Cross Street, Hatton Garden.

IS THE

# EFFICACY

OF

# COW-POX

IN PREVENTING

# SMALL-POX

THE SAME NOW

AS

## THIRTY YEARS AGO?

CARLISLE:
PRINTED AT THE OFFICE OF CHARLES THURNAM,
1836.

thousands to their graves—there was the active and philanthropic Larrey, stemming the tide of human blood—husbanding the waste of human life—pouring oil and balm into the wounds of his countrymen—diminishing the havoc of outrageous war—and gathering a fund of observations for the advancement of medical science, which perhaps no former period of the world offered such splendid opportunities of collecting, and for the accumulation of which perhaps no preceding surgeon was more unexceptionably qualified.

It may easily be imagined, therefore, that from a volume, of five hundred pages, emanating from such a source, no single article, however long

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# "VACCINATION."

*To the EDITOR of the CARLISLE PATRIOT*

Sir,—Entertaining as I do, on general grounds, an aversion to obtrude myself on the notice of the public without strong and adequate reasons, and feeling, moreover, a special disinclination to have recourse to the public press as a medium of conducting medical discussions, I am only induced by what I conceive to be tolerably weighty personal and public considerations, to depart on this occasion from my usual rule.

It will be remembered that about two months ago, a the Annual General Meeting of Subscribers to the House of Recovery, when offering some remarks on the efficacy of vaccination in preventing small-pox, I took the opportunity of stating that I was one of those who believed that the stock of vaccine lymph in present use is not so efficacious in preventing that disease as it formerly was. This I am still disposed to maintain; and could I not confidently pledge myself, as I now do, to lay before you a few satisfactory arguments in support of that opinion, nay, even to supply you with proof of its accuracy, as far as *their* admissions are proof of such accuracy, from the writings of some of those who affect to disbelieve it, I should not have indited one word on the subject. Lest my motives and opinion respecting the value of vaccination, be misunderstood, so as to prejudice the remarks I am



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It may easily be imagined, therefore, that from a volume, of five hundred pages, emanating from such a source, no single article, however long

about to offer, allow me to premise that I hold in the highest estimation that invaluable boon to our race; I recommend and practice on every opportunity both primary or infantine, and secondary or adult vaccination: while my object is to arouse attention to the best method of keeping up a good supply of the virus in order to render the operation as effectual as possible, and thus (for how else can it be accomplished?) to secure to it the full and ready confidence of all classes.

On reading the Report of the Committee of the Dispensary lately presented by them to the general meeting of subscribers, and reported in your last number, I was surprised to find a large portion of the document to consist of dogmatical and self-complacent remarks on this question,—one that has hitherto been very imperfectly considered by the medical practitioners *at large* of this country, and can scarcely as yet be said to be even *sub judice*. It is true that some, occupying high stations in the medical world, speaking *ex cathedrâ*, and who ought to have been entitled to the name of medical authorities, but *are not*, have expressed an opinion (scarcely, however, conclusive, as will be seen) on the subject: others have come to a diametrically opposite decision, and each party has acted accordingly. The Dispensary Committee step forward at this early epoch, and offer an unasked, unexpected, and peremptory adjudication of the question, declaring that one of the views regarding the nature and operation of the cow-pock virus is "not only unphilosophical, but contradicted by its history."

Doubting no less the possession of data and means on the part of the Committee to enable them to arrive unassisted at such a result of their enquiries, than I deny the right and propriety of their thus expressing it, I again glanced over the semblances of argument there produced, and at once recognised the positions taken up on this subject in an essay lately written by a physician in the metropolis, whose medical writings are remarkable for any thing rather than perspicuity and consistency. The line of argument and the expressions used in these two productions are in many respects so ludicrously similar, that one might have supposed the Committee had had access to the Essay al

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luded to, or were, at all events, enlightened by the same "philosophy," as the following extracts will show. So great, however, is the discrepancy between the dicta of these two authorities on another point, and that a vital one, that we are at liberty either to conclude that the coincidences of argument and expression, where they do occur, are quite fortuitous, or that one party has misunderstood and given a blundered version of the views of the other. First, for the points of correspondence:—

COMMITTEE'S REPORT.

"The idea that the vaccine virus has become deteriorated by transmission through the system of so many thousands of persons, is not only unphilosophical, but contradicted by its history.

"An opinion has been entertained that cow-pox gradually loses its influence, &c. This is a question exceedingly difficult to decide, for years must elapse before it can be answered beyond the possibility of doubt. If there be such a limitation of it's," &c., &c.

"The practice of re-vaccinating, however, at distant intervals, may be resorted to with propriety, as the operation is simple and attended with no risk, and the security of the individual is thereby rendered doubly sure."

DR. G. GREGORY, OF LONDON.

"It has been repeatedly urged that the vaccine virus deteriorates by passing through a succession of human bodies,—such a notion has neither reason nor analogy in its favour."

"no doctrine so resolutely * * as that of a gradual decay in vaccine influence, is proposed as life advances. Years must elapse before this question can be answered beyond the possibility of doubt or cavil. In the meantime, however, we are warranted in saying that if such limitation does," &c., &c.

"The practice of re-vaccinating at distant intervals from the date of the primary process, is one from which no harm and much benefit may be expected. The operation is simple and free from risk. If no effect follows, the security of the individual is rendered doubly sure."

thousands to their graves—there was the active and philanthropic Larrey, stemming the tide of human blood—husbanding the waste of human life—pouring oil and balm into the wounds of his countrymen—diminishing the havoc of outrageous war—and gathering a fund of observations for the advancement of medical science, which perhaps no former period of the world offered such splendid opportunities of collecting, and for the accumulation of which perhaps no preceding surgeon was more unexceptionably qualified.

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Another or two exact coincidences of the Committee's Report, with the remarks of an Edinburgh Reviewer, might be added, but those already given must suffice. Let us next examine, briefly, into the real "philosophy and history" of the thing. The Committee say (also at second hand):—"the notion of the vaccine poison becoming deteriorated or enfeebled, is contrary to the usual physiological laws which regulate the actions of animal poisons." The *rabid* predilection for the word "poison" here displayed, is rather remarkable: the employment of the term on this occasion is of questionable propriety, and is certainly not calculated to prepossess the public on behalf of vaccination. The Latin word "virus" so often used, may certainly be thus translated; here, however, as in many other instances, it is used in quite a different sense from that in which it is applied to the poison of a venomous reptile, or of a mad dog. It is incapable of producing death, or of leaving any evil consequences behind it; and, with very few exceptions, indeed, it operates on the human frame with the greatest mildness. But waving farther allusion to this subject, let us ask, what is the analogy between cow-pock virus, and the morbific germs of some other diseases mentioned in the Report? To these, the application of the term "poisons" may be less objectionable, though it would be rather difficult to define, and still more to demonstrate, the poison of measles, scarlatina, and some other diseases capable of communication without contact; while the "poison" of itch, as has long been believed and lately confirmed beyond doubt, is an insect. The cow-pock virus is a fluid that operates mildly on the human subject (as just stated), to whom it cannot be communicated except by a very careful operation of *engrafting*, often requiring repetition, and in whom it *never yet occurred spontaneously*—but, in every case, by derivation from another source, which source originally, as all know, was the cow. It can also be directly communicated to man from the horse; but in no case has it ever appeared as a primary human disease; in all *human* cases, it is artificially engrafted. In these respects it bears no analogy whatever to the "poisons" placed alongside it by the Reporters. We shall now advance another step, and,

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having seen how it differs from other viruses in the mode of its introduction into the human system, shall enquire in what respect, as an *engrafted* human disease, it differs from *natural* human diseases, in its transmission through numerous individuals. Bearing in mind the very peculiar nature and origin of the vaccine disease, we might naturally enough expect that the subsequent history of this anomalous affection—disease—or call it what you will—should present few analogies with that of the human viruses. This idea, however, according to the Committee, "is unphilosophical, and contradicted by the history of the vaccine virus." "If," says the Report, "the vaccine virus be capable of degeneration, it is the only animal poison in nature that is so." It is, indeed, in other respects, a very *peculiar* "animal poison," as we have seen; and in this respect *also*, it is somewhat peculiar. Do the Committee not know that medical men engaged in weekly vaccinations are at considerable pains to keep up a good supply? Are they not aware, that, whether there be a spurious plague, spurious itch, or any thing else spurious "in nature," there is—and probably has been from the first week of its introduction—a spurious or "irregular" form of vaccine disease? How the Committee in the face of this fact can deny the tendency of the vaccine virus to undergo deterioration, I cannot conceive. Even vesicles *to all appearance regular*, often afford impure matter now-a-days; "three or four children," says Dr. Geo. Gregory, —the Committee's own chief authority,—"vaccinated from the same source, may exhibit irregular appearances, yet the vesicle itself, from which the lymph is taken, shall shew no apparent deviation from the healthy state." This is important testimony from the *no deterioration* writers, and must be allowed its full weight when they propound another of their specious arguments, viz., "the cow-pox vesicle of the present day presents the same appearances, and goes through the same regular course, as that which was delineated and described by Dr. Jenner." This is a kind of easy and loose logic which ought not to satisfy the public, nor those to whom its health is entrusted; the question is, is the efficacy of cow-pox in preventing small-pox, the same now as thirty years ago? The Committee say

thousands to their graves—there was the active and philanthropic Larrey, stemming the tide of human blood—husbanding the waste of human life—pouring oil and balm into the wounds of his countrymen—diminishing the havoc of outrageous war—and gathering a fund of observations for the advancement of medical science, which perhaps no former period of the world offered such splendid opportunities of collecting, and for the accumulation of which perhaps no preceding surgeon was more unexceptionably qualified.

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it is; "although vaccination is not a perfect antidote, it is the best that can be had, and it is just as much so now, as it was in the days of Jenner." This, as usual, is the echo of an opinion of Dr. G. Gregory's; the Committee, however, to do them justice, are more consistent, and true to one line of argument, than he. Dr. Gregory had, of course, very different sources of information, and either had his eyes opened to, or could not close them against, a host of evidence of the opposite kind, whose claims, while unwilling to allow, he yet felt himself bound to mention. Thus, he tells us, that only in 1820, the Report of the National Vaccine Establishment, "declared that of more than 60,000 persons vaccinated in London and its vicinity in the course of twelve years by that establishment, five only are reported to have been subsequently affected with small-pox." And although he endeavours to depreciate the value of this testimony, it must be apparent to all, that such an Institution would not deceive the public by stating proportions which bore scarcely any relation to the truth, as he would have us believe.—Such proportion is very different from what the subsequent experience of Vaccine Establishments can supply. But I am pledged to show from the writings of the *anti-deterioratimists* that they admit not only the possibility, but the absolute fact, of the more frequent occurrence of small-pox in vaccinated persons of late times, as compared with the earlier periods of the vaccine era. Gregory speaks of "the detailed enquiry which the frequency of the occurrence in recent times appears to demand," and says, in another part of his Essay, "whatever difficulty there may be in determining the exact proportion in which vaccination fails to impart that perfect and permanent security against small-pox *which was its early attribute*, it is clear that the cases of vaccine failure are very numerous, for they have forcibly attracted public attention," &c. What will those who are at all conversant with the subject think of Dr. Gregory's intelligibility and consistency as an author when, bearing in mind his own admission formerly quoted, respecting apparently regular vesicles containing inefficacious virus, they read, "So far from believing in any deterioration of virus from successive inoculation, there is reason to believe

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that by a careful selection of well-predisposed children, the pock may even be restored from an imperfect to a perfect state, and by proper care, therefore, may be retained indefinitely in that condition?' What will they further think when, keeping the foregoing in view, they again read, "If children are successively vaccinated from each other, all of whom are from various causes ill-disposed to take on the perfect disease, the virus may unquestionably degenerate, and at length wear out altogether. In tropical countries and in confined localities such an occurrence certainly takes place, but this is very different from the notion of a virus deteriorated by the mere influence of *time*."—So that, according to this lucid writer, apparently good pocks may really be inefficacious ones: decidedly irregular ones may be converted into perfect ones: and thirdly, the virus may "unquestionably degenerate," and even "wear out" under specified circumstances. Why, as to this last declaration, it is all that was demanded of these deniers of its deterioration; it is even more. Few that wish to be enlightened on the nature and history of cow-pock, would ever anticipate the account of its retreating and advancing powers, of its harlequin transformations, and its final exit from the stage, as just quoted. The disclaiming of its deterioration by the *mere* effect of "time," is a *mere* quibble; no such opinion was probably ever broached in these unqualified terms. It is the transmission of the virus through numerous individuals in various conditions as to health, climate, &c., that is pointed at as the cause of its weakened powers,—a cause that, it would appear, there are some wights hardy enough both to deny and admit.

Other proofs exist of the virus not acting with the same energy on the human frame, as formerly: the recently procured virus, for instance, was found to affect the constitution pretty briskly, whereas it is now commonly remarked, that such constitutional disturbance is scarcely ever seen. Then, again, many thousands of those vaccinated soon after the general adoption of the operation were exposed to the influence of small-pox, nay, were purposely inoculated therewith, yet with impunity. The case is not so now. Instances are not wanting, though they are rare, of even

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infants dying of small-pox within three or four years after vaccination. The opponents of the deterioration doctrine are ready to allege that the operation has been imperfect (how strongly must they then see the analogy of the virus to their list of "poisons"!) I am not disposed to deny it. I feel convinced that the matter in present use cannot be depended on with that implicit confidence, that the original virus deserved and received—yet, such as it is, it proves, when attentively selected and introduced, an antidote of no mean powers, and *must*, of course, be assiduously employed with all due precautions, until a *renewal of the stock*. I am aware that by many "good easy people," this proposal is scouted as visionary, or at all events, unnecessary: but if such do not examine, understand, and appreciate the evidence that bears on the important question, it is to be hoped others will, as, in some places, others have done, and proceeded accordingly.

"In tropical countries," says Dr. Gregory, "and in confined localities, such an occurrence, (deterioration and even 'wearing out' of the virus) certainly, takes place." How strikingly analogous is this, to be sure, to the fate of the other "animal poisons"! How likely is small-pox, for instance, to become extinct in tropical countries, &c.! Again, being *analogous* to cow-pox (!), "subject to the same laws," how fearfully it must have raged 25 years ago, in certain tropical countries, simultaneously with the triumphant progress of vaccination! The reverse, of course, of all this, is known to be the fact. We have seen how affectionately Dr. G. and others cling to the old stock of virus, which is asserted to be capable of indefinite renovation, without recourse being had to its original source: let us also consider his *positive objections* to renewing the supply from the cow, for (will it be believed?) he actually entertains objections against that proceeding. The proposal to renew it is not only "*specious*," as he sneeringly remarks, but is "philosophical," as even the Dispensary Committee may be brought to own. It could, moreover, be very easily carried into effect, were the powers of the legislature, and the dormant energies of the sinecurists of the National Establishment, aroused and engaged on its behalf. Not content,

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however, with making the expediency of that proceeding a mere matter of opinion, Dr. G. actually endeavours to prejudice the public against the use of virus fresh from the cow. First, he says, "there must always be a doubt as to the purity and genuineness of the new stock, until the experiment of variolous inoculation has been subsequently made, which parents are very seldom disposed to allow." So it would be more difficult now-a-days than 30 years ago, to test the efficacy of recent cow-pock matter by small-pox inoculation? It is much to be feared that a larger proportion of the humbler classes would now be found agreeable to have small-pox inoculation practised than formerly, whether as a test or otherwise. It is a matter of notoriety that many are disposed to return to it, and can only be induced to continue their confidence in vaccination, on the strongest representations being made to them of its superiority. Dr. Gregory admits, as an *undoubted certainty*, that the use of the present virus does not prevent the very frequent occurrence of small-pox in a more or less modified form; yet would forego the advantages which he cannot deny, *might* result from employing a new stock of virus, lest he should not be able to practice small-pox inoculation as a test! Secondly, he says, "further, the true vaccine lymph, as first taken from the cow, is frequently very acrid, producing glandular swellings, &c., &c." Observe, this is said of the *true* lymph: how little then has it, to use the words of the report, "become deteriorated or enfeebled"! How unimpaired are its energies since its first abstraction from the cow! Your readers will thus see that the very difference between the qualities of recent and long humanized lymph, which I maintain does exist, is taken by this writer as a ground of objection to the occasional renewal of the supply.

In Italy, and in the East Indies, the stock of vaccine virus was some years ago renewed, from the *suspicion*—if not the conviction—that the old stock had become nearly inefficacious. Speaking of Italy, Dr. Gregory says, "there was no perceptible difference between the course of the old and new lymph." I will not here charge him with unfairness: he should, however, if he knew it, not only have stated the "course" of the lymph, but its ef-

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fects as a perservative. In India, according to a reviewer of the Indian vaccinator's essay, the prophylactic power of the new matter was "proved to be complete" in several instances: and he expresses a hope that Mr. Macpherson's operation of recurring to the new virus will be adopted by others, notwithstanding that the constitutional effects resulting from the recent cow-pock in India are much more severe than those produced by what the reviewer calls "the mild and benign) eruption" occurring in English cows, and from which Jenner drew his supply, but which Gregory would not dare to use. He is compelled, however, to make the following avowal:—"More recent experiments in India tend to shew that the measure may, on some great occasions, be adopted with advantage," but with what reluctance is it extorted from him! He adds, —but it is clear, even from these statements, that recurrence to the cow is not lightly to be recommended, nor adopted without great and multiplied cautions." Dr. Gregory's organ of caution, to speak phrenologically at least, if not "philosophically," must be preternaturally large or energetic, to induce him thus to interpose imaginary difficulties between the British public, and their accomplishment of a most important object, and one fraught with no possible danger, to the advantage—nay, necessity of which, it is to be hoped, they will not long remain insensible. Had the cautious gentleman been a contemporary of Jenner's, it is extremely probable he would have continued *an inoculator of the small-pox*.

Another real or supposed feature of vaccination is alluded to in the report, viz:—The gradual loss of its protective influence in any given individual, as that individual becomes older. To this, neither in the report nor in Gregory's essay, does there occur any strong opposition: although there be no "analogy" to support it, its possibility is not denied, and accordingly re-vaccination at distant intervals, is recommended in the same words, as a practice involving no risk. Believing, as I do, in the gradual deterioration of the general stock, from whatever combination of causes, I am also disposed to believe, with Gregory, and others, that even recent virus may at length cease to afford to an individual the full protection it gave

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him for the first few years. Dr. G's words are, in one place, "the early experiments of Jenner and Woodville sufficiently proved, that for two or three years at least, after vaccination, the human body is unsusceptible of small-pox by inoculation": in another, he shews "how much more frequent small-pox after vaccination is among adults than children": and says, in a third, "we are strongly disposed to believe that the susceptibility of small-pox does return in many cases, more especially when favoured by certain concurrent circumstances. Of these, the most energetic hitherto ascertained are, change of climate, and the period of puberty."

It appears highly probable from all that has been advanced, that the present tendency of small-pox to increase its inroads, might be materially lessened by the adoption of two measures:—

I. Having recourse, after a certain limited interval, again and again to the original source of cow-pox, aided by the sanction and authority of government, and its interdiction of the use of old virus, where recent could be procured.

II. The re-vaccination of individuals even under these circumstances, more particularly when approaching maturity, or about to change their climate.

In conclusion, I beg to state, that had not the opinion respecting the gradually decreasing efficacy of cow-pock matter, on which I ventured a few remarks at a meeting before alluded to, been so summarily dealt with in their Report by the Dispensary Committee, bespattered with illogical and therefore "unphilosophical" attempts at argument—not indeed original, but culled from various kindred sources—and a copy of its condemnation, thus sealed without evidence or pleading being heard in its favour, sent to the public press as well as handed to the supporters of that useful Institution, very few considerations indeed, should have induced me thus to trespass on your columns, and on the patience of your readers. And although I regret that the Dispensary Committee have been so ill-advised as to frame *two-thirds* of their Report of "shreds and patches" of medical controversy, to the exclusion of the usual notice of accidents and other surgical cases, I shall

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consider that an object of no small importance has been gained if, by what has occurred, the attention of the public be awakened to the subject, and all professions and classes be ultimately induced to join their efforts towards providing a remedy, if such can really be found, for the defects that attach to vaccination. I am, Sir,

Your obt. Servant,

English-street, Feb. 23rd, 1836. WM. ELLIOT.

CHARLES THURNAM, PRINTER, CARLISLE.

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THE

# Medico-Chirurgical Review,

## No. XXIX.

APRIL 1, to JULY 1, 1831.

### I.

**Clinique Chirurgicale, exercé particulièrement dans les Camps, et les Hôpitaux Militaires depuis 1792, jusqu' en 1829. Par *Le Baron Larrey*, Membre de l'Institut de France. 3 Volumes 8vo. with a Volume of Plates. Bailliere, 1830.**

In an age of books—when every cradle sends forth an author—when those who write are scarcely surpassed in number by those who read—and when, notwithstanding all this *cacoethes scribendi*, we are doomed to wade over twenty volumes, before we meet with one which repays the purchase-money, or is worth enrolling in our private catalogue—it is refreshing to peruse such a performance as the *Clinique Chirurgicale*. Unlike the provincial Essays of our lane-and-hedge observers, in which a few fancies are concocted by a strong imagination into the form of facts, and artfully spread over an extended surface, that however they may lack in matter they may not be confined in mould—it teems in rare and weighty knowledge, and every position, fact and statement are communicated through the medium of cases, which are too circumstantially recorded to be suspected of inaccuracy.

It fell to the happy lot of Larrey, to become the intimate friend and field-companion of the most enterprising warrior, that ever ransacked empires and shattered thrones—to follow him in all his flights of victory—to accompany him in all his journeys of ambition—to fight with him in all his battles—to share with him in all his fortunes—to see every variety of disease in almost every country, and to treat every form of accident under the influence of almost every climate. Witness of twenty-six campaigns in the four quarters of the globe—whether stationed amid the burning sands of Egypt, or the frozen wilds of Russia—wherever the eagles of Napoleon, or his armies flew—wherever the cannon and the sword were sent to sweep thousands to their graves—there was the active and philanthropic Larrey, stemming the tide of human blood—husbanding the waste of human life—pouring oil and balm into the wounds of his countrymen—diminishing the havoc of outrageous war—and gathering a fund of observations for the advancement of medical science, which perhaps no former period of the world offered such splendid opportunities of collecting, and for the accumulation of which perhaps no preceding surgeon was more unexceptionably qualified.

It may easily be imagined, therefore, that from a volume, of five hundred pages, emanating from such a source, no single article, however long

or laboured, could extract every important fact, or review every interesting sentiment. Some observations must be overlooked, and some statements must remain uncriticised; but as the present is the first of these volumes, to each of which equal attention is indispensable, the most striking novelties only have been culled, and less important matter has been referred to.

*Diseases of the head* occupy the principal portion of the present volume, and it is mainly to the consideration of these affections that our attention shall be confined; but as some observations, of considerable interest, are contained in the Baron's sketch of the nature and treatment of wounds in general, as well as in his views of tetanus, it might not be well wholly to overlook them. While speaking of wounds produced by the bite of a rabid animal, he takes occasion to state his opinion as to the nature of *hydrophobia*.

"It is difficult," he says, "to explain how the virus of a rabid animal can remain latent in the system for a long time, can develop itself afterwards, and can end by producing the most terrible effects. It would, nevertheless, appear that this subtle and unknown poison has a particular partiality for the nerves, and concentrates itself by preference in the nervous system; in which it can remain inactive for a lapse of time more or less considerable, on an average, as we have said, of thirty or forty days. Its effects, when it is developed, are purely nervous, and it is this fact which seems to justify this assertion."

It cannot be denied but that the most evident indications of inflammatory action attend the symptoms, and distinguish the pathology of hydrophobia —that we have often inflammation of the œsophagus, pharynx and larynx, and occasionally of the brain and spinal cord; yet it is generally admitted, that these appearances are more the consequences than the cause of the disorder, and that although frequently present with, they are by no means essential to, the existence of hydrophobic action. Rossi of Turin has performed experiments, which, were they sufficiently confirmed, must be regarded as strongly corroborative of Larrey's theory. He dissected out a portion of nerve from the body of a rabid animal, during the violence of its paroxysm, and making an incision into the flesh of a healthy animal, inserted this extracted piece of diseased nerve into the incision. After some time, the animal, thus inoculated, became equally mad with the one from which the poisoned nerve had been received, and died affected with the same symptoms. The following case will be read with interest, and strongly favors the author's doctrine—that hydrophobia is purely a nervous disorder. A soldier, æt. 20, had his thigh bit by a mad dog, when a youth of between fourteen or fifteen years of age. From this period, until he came under the care of Larrey, Courmontague did not cease to experience a kind of nervous affection, which was characterized by spasms and a slight aberration of the intellectual faculties. He was irritable, very loquacious, and was frequently agitated by automatic movements. He was emaciated, his eyes were haggard, he was often afflicted with vertigo and dimness of sight, and he felt an invincible repugnance against the sight of limpid fluids, even in circumstances in which his companions, oppressed by heat, were compelled to drink in his presence. He drank bitter ptisans and other coloured liquids with more, or less avidity. These were his principal symptoms when he came under the management of Larrey—not on their account—but for a sprain of the right foot, which he had received during



violent exertion. To this affection were soon superadded symptoms of nostalgia, and Courmontague expressed a strong desire to be dismissed the service. Obstinately bent upon this purpose, far from allowing his cure to proceed, he secretly employed means to swell the leg and to aggravate the disease; so that in a short time gangrene appeared in the inside of the foot, and spread so hastily that the whole limb became sphacelated, and was amputated. After some attacks of traumatic irritation, caused by deviations from the prescribed regimen, two-thirds of the wound had cicatrized, when, on the 30th day after the operation, the patient suddenly refused all kinds of transparent liquids, and became attacked with signs of cerebral inflammation. He was convulsed, he locked his jaws, he ground his teeth, and fell into a complete state of tetanic contraction. All the excretions were suppressed, the spasm and rigidity increased, and during the night of the 33d he expired. On inspection were found hypertrophy of the cranium, principally in the occipital region, considerable engorgement of the vessels both of the membranes and brain, of the superior longitudinal sinus and plexus choroïdes; slight granulations on the surface of the hemisphere; about an ounce of yellow serum in the lateral ventricles; firmness and density of the whole brain, of the spinal cord, and especially of the tuber annulare, in the substance of which a red tinge was evidently manifest; and the neurilema of the spinal nerves was stained of the same colour. The mucous membranes were all healthy; except a few old adhesions, nothing morbid could be detected in the lungs; and all the viscera of the abdomen presented a natural appearance. The pericardium was firmly attached to the heart in its whole extent, but evidently by adhesions of a former date; its cavities were very contracted, and the great vessels, which issued from it, were not more than two-thirds of their ordinary size.

It is tolerably evident, from the history of this case, both before and after death, that the first and last symptoms, by which it was distinguished, were referrible to the wound occasioned by the bite of the mad dog; and that the poison, which had been thus inserted in the system, remained comparatively latent for the period of six years, giving rise to some anomalous nervous symptoms only, which scarcely if ever amounted to disease, until meeting with an exciting cause, which awoke this dormant principle into full activity, the patient was no longer respited from its fatal consequences. There are very many facts, however, in existence relative to hydrophobia, which in our minds distinguish it clearly from ordinary tetanus; and unless there was much stronger reason than there is for identifying these disorders, no one should make the attempt, as it is only calculated to lead the unthinking into a state of carelessness, with reference to what is now generally considered the almost exclusive cause of this formidable malady.

There is nothing in the Baron's observations on the treatment of *punctured, lacerated*, or *poisoned wounds*, which may detain us. In *traumatic erysipelas* he is a strong advocate for the application of the actual cautery. According to him it scarcely produces any pain, it diminishes the heat, redness and tension of the affected parts, it is never followed by gangrene or suppuration, but ends in small dry eschars, which leave no sensible cicatrix, and it rapidly improves every symptom. How it effects all this he labours to explain, but his *modus operandi* is much more tedious than satisfactory. In spontaneous erysipelas he has found the same remedy equally beneficial;

and whether the sovereign efficacy of the iron precludes the necessity of every other measure we know not, but certain it is, that the worthy author has not condescended even to hint at our humble efforts to establish a *coups de main* treatment of our own. Thirteen-inch incisions are apparently as little thought of across the Channel as they are at present here, and although we should be sorry to see the scalpel or needle prohibited in every case of erysipelas, convinced as we are of their utility in many, yet it may be as well both for their patients and themselves, that the primitive proposal of our English surgeon stands as little chance of adoption by the French, as that of the French surgeon probably does by the English. The fallen fate of this celebrated proposal has been obviously accelerated by the injudicious manner in which it was advanced; and as truth has frequently been scouted as error, because intemperately advocated, so real improvement may totally miscarry, by being brought forward with unnecessary parade and defended with dogmatic obstinacy.

The contagious character of *hospital gangrene* Larrey feels no scruple in maintaining; and if extensive observation can enhance experience, his testimony to the fact cannot with ease be set aside.

"When wounds, that have been far advanced towards healing, have been inoculated with matter from a sore affected with this disease, they have put on the same appearances, and have been converted into putrid ulcers. The linen, with which such tainted sores are surrounded, and the instruments employed in dressing them, are faithful conductors of the poison. The inoculation has been performed under my eyes, I have watched its progress through every stage, and, however it may oppose the sentiments of others, I entertain no doubt of the contagious nature of this affection."

It is generally, he admits, idiopathic, but, in opposition to the Professor of Montpellier, he considers that occasionally it is symptomatic of a deranged condition of the gastric organs. In such cases an emetic, sulphate of quinine, camphor, opium, and light mineral acids, will arrest its progress, dissipate the local irritation, and restore the wound to its originally healthy state. In idiopathic cases, local treatment is more necessary. The *eau de Labarraque* is one of his most favourite applications, and after the sore has been thoroughly deterged by this fluid, the actual cautery, in a state of incandescence, is liberally applied. This formidable weapon finds no equal in the choice of Larrey. Wherever the secretions are deranged, or the granulations are unhealthy; if the sore be indolent and too slowly heals, or be too active and becomes luxurious, *le cautère actuel* is the safest, speediest, and most sovereign remedy. It diminishes pain, dissipates inflammation, cleanses the wound, rectifies the granulations, recalls the secretions, and confers upon the patient "an inexpressible calm." Deducting our *granum salis* from this highly wrought estimate, and making all due allowance for paternal partialities for a favourite remedy, the actual cautery stands recommended to our regard by more than an average weight of unexceptionable evidence, and although a few prejudices have as yet to be overcome, we look forward to a period which, we imagine, is not far distant, when this Gallic weapon, barbarous as it may at first appear, shall be wielded with perhaps more discrimination, but not less faith by our English surgeons. If our acids and our alkalies, our nitrates and our sulphates, could achieve all that the actual cautery effects, the French had, long



ere this, arrived at a discovery, which would have dispensed with a remedy so obnoxious to human feelings; and when the instantaneousness of its action is balanced with its intensity, there is reason to doubt whether the *actual* is more severe than the *potential* cautery.

In common gangrene this application is not recommended. While it alleviates and arrests the contagious form, it extends and aggravates the latter. Contagious gangrene is more a local, common gangrene more a general disease, and therefore less likely to be cured by topical remedies. While the French were in Egypt they were sadly persecuted by this affection. Even the slightest wounds, inflicted by the purest instruments, were attacked by gangrene; and those, who were seized by yellow fever while labouring under any solution of continuity, scarcely if ever escaped.

Larrey's description of *tetanus* is so excellent, that nothing but want of space prevents us from extracting it. He has found it especially to invade the young during great vicissitudes of temperature, and such as were of a dry, irritable temperament. Fear of limpid fluids he states as a frequent symptom, and the absence of all intellectual disturbance, while the disease seems to revel in the nervous system, he is inclined to explain by believing that the nerves are not prolongations, but perfectly independent of the brain. In emprosthotonos he has observed that the nerves usually affected lie on the anterior part of the body; in opisthotonos on the posterior part; while in complete and universal tetanus both sets are equally implicated. After the battle of Waterloo, he had many opportunities of inspecting the remains of those, who perished from tetanus in the hospitals of Louvain; and "invariably there were discoverable evident traces of inflammation on the spinal cord, with more or less effusion of a reddish colour within the sheath." Hence does he advise moxa, cupping-glasses, anodynes, and such applications to the spine as appear calculated to prevent, or remove the cause of irritation. Internal remedies of every description, if they are not always useless, are soon rendered so by the patient's falling into a state of strangulation shortly after he is attacked. While he can swallow, opium, camphor, musk, castor and alkalies may be given, and they are least obnoxiously given in the form of emulsion. The case of a Mameluke, belonging to Maurad Bey, is given, who was cured by internal medicines and warm-baths. Eight grains of camphor, the same quantity of musk, and twenty grains of opium were dissolved in a glassful of common emulsion, and the half was given for a dose. A few minutes after this draught was taken, the pains were diminished, the jaws relaxed, and sleep returned towards night. Next morning the patient felt much better, suppuration of the wound was re-established, the remainder of his medicine was taken as a second dose, all went on favourably, and he proceeded along his journey in return to his prince. Friction with oil, which some have so liberally extolled, he has not found to do any good; cataplasms made with the leaves of tobacco have been fruitless, and mercurial unguents produced only evident evil. "The employment of this last remedy," he observes, "even against syphilis, requires in Egypt the greatest care; for this mineral, administered in that climate as it is in Europe, has occasioned the worst consequences, among which we may enumerate madness and diseases of the liver." When tetanus appears after the wound has healed, cutting freely down upon the cicatrix is strongly recommended; but if after a ligature has been applied,

it is probable that some nerve is included, and the ligature should be removed. In all compound fractures and dangerous wounds of the extremities, complicated with tetanic symptoms, the Baron's only sheet-anchor is the amputation-knife. From the success, which he has experienced in removing tetanus by amputating the wounded part, he has been encouraged to make the following proposal. "If, in tetanus, induced by such a wound of the extremities, as would not on its own account demand amputation, it be not better to remove the limb immediately tetanic symptoms appear, than to expect from the resources of nature and most uncertain remedies a very doubtful cure?" We cannot enter into his defence of this proposal, which merits serious consideration; but he concludes it, by saying that, "although I regret not having a greater number of recoveries to attest the value of this plan, I yet have sufficient to conclude that amputation, *faite à propos*, appears to me the most certain means of arresting and removing the effects of tetanus, which depends on a wound situated upon the extremities."

The Baron's favourite caustic is no mean remedy in tetanus, as well as gangrene, and the recovery of the patient, with whose case we shall conclude these observations upon this disease, which the author considers *one of the most remarkable in military surgery*, cannot certainly be ascribed to any inferior agent. A soldier was struck by a ball, which carried away a part of the spine belonging to the right scapulum, a portion of the trapezium, the sub and supra-spinati muscles. The shattered tendons were cut away, the lacerated pieces of muscles were removed, some splinters of bone were extracted, and the wound was carefully dressed. All went on well for some time, and the circumference of the wound began to cicatrize, when symptoms of tetanus suddenly appeared, and in a few hours after their appearance complete opisthotonos was established. Diaphoretic fluids and large doses of opiates were administered; oily, camphorated, and narcotic lotions were applied over the body. The purulent secretion being suspended the cicatrix made rapid progress, and in forty-eight hours it covered the half of the wound. At this period the patient felt in the cicatrized part a painful sensation, as though the edges of the wound had been enclosed between a pair of pincers; and the slightest pressure upon the delicate cicatrix, more especially of metals, as iron or steel, obliged him to emit piercing cries. Every tetanic symptom gradually increased, the superior extremities became rigid and were turned backwards, the cervical vertebræ were completely pulled down, and the power of deglutition was lost. In vain were two incisive teeth extracted, in order that medicines might be introduced into his stomach; not a drop got into the œsophagus, and the mere sight of pure water induced the most frightful convulsions. He foamed freely at the mouth, every symptom heightened, and this wretched man, whose bodily agony was ten-fold enhanced by a complete consciousness of his situation, had nothing to all appearance before him, but the prospect of a sad and sudden death.

When the disease had arrived at this crisis, Larrey resolved on trying the actual cautery.

"With this view," says he "I made red, even to incandescence, four large cauterizing irons, and I applied them in succession over the whole extent of the wound, so as to bear more strongly over those points of the cicatrix, where I suspected the principal branches of the accessary nerve of Willis (spinal nerve) to be compressed and swollen. This application was extremely painful, nevertheless I had firmness enough to continue the operation, until all the surface of the wound was deeply and completely seared. Scarcely was this effected when a general stop was put to the progress of the disease. The patient voluntarily sat up and asked for drink, and the jaws separated spontaneously. Sixty drops of laudanum, and a few drops of Hoffman's mineral liquor were given him in a glassful of almond emulsion, in which a little nitre had been dissolved; the narcotic and camphorated liniments were repeated and the body was enveloped in warm flannel. The skin perspired profusely, a perfect calm came on which was succeeded by a deep sleep, and the next morning I found my patient free from every tetanic symptom."



The future dressings of the wound were simple, the eschar separated in nine or ten days, cicatrization recommenced speedily and without pain, and, beyond a little stiffness in the right arm and shoulder, Demoré was completely restored to health.

Larrey's views of *wounds of the scalp* and his treatment of injuries of the scull exhibit no peculiarity. Sutures, in the majority of cases, he strongly reprobates, the lightest dressings he particularly recommends, and, unless some urgency occur which requires these dressings to be removed, he advises them to be left undisturbed during the first seven days after the infliction of the injury. The latter part of this advice is extremely suspicious, and should not, we apprehend, be implicitly adhered to; for the natural secretions of the wounded part, accumulating and putrefying for such a period, could not fail to irritate and inflame the sore. What, therefore, might be gained by uninterrupted quiet, would probably be lost by want of cleanliness.

When the solution of continuity has passed through the integuments of the head, and proceeded to the brain, the symptoms vary with the part disturbed. If the anterior or superior extremities of the hemispheres have been injured, the Baron has generally observed that some sense is destroyed, or some intellectual function is deranged. Whereas, if the cerebral injury be limited to the base of the encephalon, no mental aberration can be perceived. In such instances different paralytic symptoms appear among the muscles, and the organ palsied invariably belongs to the side of the body opposite to that on which the injury was received. "These two principles," says the author, "suffer no exception, notwithstanding what has been asserted to the contrary;" and as several very interesting cases are detailed in their defence, it cannot be said, by such as consider them untrue, that they are likewise unsupported.

A soldier received the stroke of a sabre on his forehead over the coronal suture, which occasioned slight compression of the anterior lobes of the brain. In addition to the inflammation, which followed this injury, and which was subdued by the usual remedies, the only symptom which marked the progress of the cure was a very manifest incoherence in the ideas of the patient. His answers, although sometimes precise, had more frequently no reference to the questions proposed; but by proper care he was dismissed from the hospital, after six weeks, in all respects well.

Another soldier was similarly wounded on nearly the same place, and was brought under Larrey's care. On making out the history of his complaint, it was discovered that he had, on different previous occasions, re-

ceived several injuries on the anterior part of the head, and that from that period to the present time his intellect betrayed some traces of derangement.

A grenadier was shot by a ball, which buried itself in the mastoid process of the left side of the head. Hemiplegy of the right side came on and he died in a state of lethargic torpor.

Nicholas Baumgartner, in an engagement with one of his companions, while under the influence of wine, received a blow on the left eye, and a part of the rod, with which it had been inflicted, was left behind in the orbit. Palsy of the left side came on, and although the wound and the hemiplegia occupied the same side, the Baron confided with so much confidence on the accuracy of his principle, that, in opposition to appearances, he referred to the right hemisphere as the principal seat of injury. No mental aberration was discoverable. The patient, on the contrary, was quite sensible of his situation, and replied to every question always rationally, although sometimes by signs, as he occasionally experienced some difficulty in articulating. Two days after the receipt of the injury he died, and, as had been anticipated, a small piece of wood, some lines in length, was found embedded in the middle lobe of the right hemisphere, near the fissure of Sylvius.

The following is an extremely instructive case. During the Russian campaign, a young grenadier received a wound from a lance on the posterior part of the head, towards the centre of the lambdoidal suture. The weapon was so well tempered that it penetrated far into the left posterior lobe of the brain, without producing any serious injury to the bone. The wounded man was left for dead upon the field, but being afterwards carried to a neighbouring village, his wound was dressed and ultimately healed, leaving, however, the patient deprived of most of his senses, and seriously impairing the functions of many of his internal viscera. The voice, after having been at first hoarse and obscure, was gradually lost, hearing, taste and smell were weakened, and the muscles of the larynx being partly paralyzed, this organ sunk down for half an inch below its natural position, in consequence of which the glottis was constricted, and the epiglottis curved down upon the rima by the irregular action of the muscles by which this cartilage is moved. In order to respire, the patient was compelled to clash his jaws firmly together, so as to raise the larynx by a simultaneous contraction of the attollent muscles of the pharynx and lower jaw, just as frogs do when swallowing air to fill their lungs. The diaphragm, participating in this paralysis, could no longer act upon the lungs: the pharynx, œsophagus and stomach had equally suffered. The abdomen did not alternate in its movements with the expansion and collapse of the chest, and the slightest exercise covered the body with perspiration, and rendered the face livid. His pulse was almost imperceptible, the motion of his heart could with difficulty be recognized, and his extremities were habitually cold. The intellectual functions, on the other hand, were quite untouched, and as he was unable to reply by speech to the questions he was asked, he wrote his answers with great precision and accuracy. "All these facts," argues the Baron, "are in my opinion strongly corroborative of Dr. Gall's view, that the reasoning faculties reside in the periphery of the superior and anterior portions of the brain." This fact we believe is now very generally admitted, but the



author proceeds farther, and gives some countenance to the ridiculous detail, into which the advocates of phrenology have imprudently entered.

"Differences," he observes, "more specific than any of those, which have yet been mentioned, are submitted to our observation in cerebral symptoms, occasioned by mechanical or morbid lesions, which certain portions of the brain have sustained. When these injuries are confined to the cerebellum, the organs and functions of generation are especially affected, and when the lateral and somewhat anterior portions of the brain are injured, in a great many cases the memory is impaired—that is to say, individuals so wounded cannot easily recollect the names of objects with which they have not had a long acquaintance, such as proper names, more especially when they are very compound. We will not attempt to explain a circumstance so singular, but facts exist upon the subject which it is impossible to overlook."

A young soldier had received, at the battle of Eslingen, a ball in the left temple, near the orbit. The faculty of vision was entirely destroyed, the left half of the cranium was more arched and protuberant than the right, and one could perceive both by the eye and touch a portion of the frontal suture, not less than an inch in extent, open by the disunion of the parietal and frontal bones. His senses and almost all the faculties of animal life were extinct. The wound was sounded, the ball, which was discovered, *vers la fosse orbitaire*, was extracted, and the aperture, through which it was withdrawn, exposed to view the pulsations of the brain. After this operation the symptoms began to improve, and as improvement advanced a new language, like that of infants when they first begin to babble, was substituted by the patient for his vernacular tongue. His affirmatives were all expressed by the single word *baba*, his negatives by *lala*, and when he wished for anything he pronounced with some force the words *dada* or *tata*. Being unfortunately seized by fever, he died three months after the extraction of the ball. On inspection the dura mater, which corresponded with the opening between the sutures, was very much thickened and firmly adhered to the edges of the separated bones, the circumvolutions of the subjacent portion of the brain were effaced, and the arachnoid and pia which covered it were much condensed and adhered to each other. An opening existed in that portion of frontal bone, which lies below the left temporal process and behind the external angular apophysis. This hole was from six to seven lines in diameter, its edges were smooth and rounded, and extending from it towards the frontal bump of the same side was discoverable a cicatrized fracture—*une felure cicatrisée*. Other vestiges of ossification were observed, in the indented edges of the separated bones, and in connecting to the os frontis a lamella of bone, which had been originally detached, by a membranous substance which was partly ossified.

A cavalry officer, æt. 26, was wounded in the upper jaw, near the left ala of the nose. The instrument penetrated into the left nasal fossa three inches and a half, traversed the cribriform plate of the ethmoid bone, and entered eight or nine lines at least into the left anterior lobe of the brain, so as nearly to reach the anterior part of the corpus callosum. Very violent hæmorrhage followed the accident, a large quantity of blood was effused into the interior of the cranium, and syncope at length occurred. Every sense was at first abolished, and afterwards only gradually returned. The right eye, right nostril and right half of the tongue, were longer than the left in regaining their activity, and the right side of the body laboured

under a general hemiplegic affection, which was very slowly dissipated. The patient's recollection of all substantive nouns, which have any analogy with proper names, was totally extinguished, whilst the memory of images and every thing which was susceptible of description remained perfectly entire. Although for a long time well acquainted with the author, he could not recollect his name, calling him always by that of *M. Chase;* and the names of his nearest relatives were equally forgotton. "The mental aberration, which this officer at first suffered, had ceased, but every thing which referred to himself, or to his history, cast him into a state of melancholy and confusion, whilst conversation, which referred to his family, his parents, or his friends, restored to him the free exercise of his intellectual faculties."

From a case which follows, in which a wound received near the external angle of the left eye, which was followed by a temporary loss of the senses and even some derangement of intellect, it would appear that this apparent defect in recollecting names is less attributable to loss of memory, than to an impracticability in pronouncing them. In this instance the patient could write down the name of any object, or person with which he was acquainted, and if some pieces of money were given him to count, he could tell their number by counting on his fingers.

Tetanic symptoms are frequent consequences of wounds of the head, and although they have been very generally ascribed to some immediate injury done to the brain or nerves, or to the inflammation which such injuries produce, the Baron is disposed to believe that they often arise from laceration of the membranes and fissures of the internal table of the scull.

A young soldier received on his right eyebrow a kick from a horse, which divided the integuments, and fractured the external wall of the frontal sinus. The hæmorrhage, which followed the wound, was great, and all his animal functions were paralyzed. Some hours afterwards, however, he gradually revived, when he began to complain of extremely sharp pains in the wounded part, and convulsive movements of the lips and mouth. In defiance of very active treatment symptoms of phrenitis appeared, and rapidly advanced, general fever and delirium speedily supervened, a state of profound lethargy succeeded to these symptoms, and on the 19th day of the disorder the patient died. The pains, which he experienced in his head during the close of his illness, were so severe that the irritation of even the mildest dressings threw the muscles of the face into convulsions, and while the left arm was palsied the right arm was convulsed as often as convulsions attacked the face. Inspection of the body disclosed to view very intense inflammation and swelling of the mucous lining of the frontal sinus and nasal fossæ, a fissure in the posterior wall of the sinus, so fine as to be almost insensible, intense inflammation of the corresponding part of the dura mater, and some extravasation of blood mixed with serum between this membrane and the right anterior lobe of the brain. The pia mater was equally inflamed and covered with points of suppuration, the substance of the brain, especially that of the right hemisphere, was dense and its vessels were engorged. The mucous surface of the pharynx and larynx was red, the bronchia were filled with reddish-coloured fluid, and the lungs, which were of a brown colour, were filled with blood.

"The rapid progress of these inflammatory and nervous symptoms, (says Larrey) at first induced me to believe that extreme sensibility of the pituitary membrane had produced them; but succeeding observation has convinced me, that they were mainly attributable to the fissure of the internal table of the frontal bone, and to injury of the fibrous texture of the membranes. I believe, nevertheless, that inflammation of the Sneiderian membrane, by its sympathetic effects upon the entire system of the organic life, contributed much to aggravate that of the meninges, having discovered in the air-passages all the traces of the same inflammation. It is likewise not without reason that the ancients regarded wounds of the frontal sinuses as very dangerous, especially when air entered the nasal fossæ, and it is on this account that they recommend the exclusion of such wounds, and every precaution which may prevent the exposure of the fine and sensible lining of the olfactory labyrinths to the air."



A cuirassier was struck by a horse so violently on the right eyebrow, that the external wall of the frontal sinus was broken to pieces, active hæmorrhage both from his nose and ears occurred, and he lay as dead upon the ground. When visited by Larrey he was insensible, his head was turned to the left shoulder, the body was of an icy coldness, and tetanic symptoms of the right side were manifest. The head was shaved, embrocations of warm camphorated vinegar were applied to the body, the loose portions of bone were extracted, and some clots of blood, which had been enclosed within the sinus, were removed. During this operation the patient bled freely by the nose and wound, and scarcely was the first dressing terminated before his senses and intellect were restored. Ice to the head, stimulating injections, diluents and other antiphlogistic remedies were employed, and as the pulse became strong and the temperature of the surface rose, a large abstraction of blood from the arm was practised. But, although all these means were assiduously employed, although the depletion was more than once repeated, pains in the occiput and in the region of the wound came on. These were somewhat appeased by making a deep incision into the integuments on the right side of the occiput, which were œdematous; but the right eye was lost, and about the 20th day nervous excitement appeared, some tetanic convulsions of the two extremities of the wounded side came on, and deep-seated pains were complained of along the entire right side of the head, which became so severe that this part could not be touched, even in the mildest way, without producing horripilation, convulsions and intense agony. Blood was successively taken from the arm, neck and foot, many cupping-glasses were applied to the nape, shoulders and spine, and ice to the head and stimulating baths to the lower extremities were continued. After some transient relief, the tetanic symptoms augmented, the right testicle swelled and gave excruciating pain, and, what is more remarkable, the hair and whisker belonging to the right side of the head bristled, and imparted a sensation of the most lively pain on the slightest touch. He was brought before the *Société de Medicine de la Faculté* of Paris, and, although his hair was cut by the very best edged scissars, horripilation, convulsions and a general painful tremor of the parts convulsed, extending even to the toes and fingers, followed the experiment. The author ascribed all these symptoms to a fissure of the right side of the occipital bone, to laceration of the subjacent dura mater, and to effusion either underneath this membrane, or the right posterior lobe of the brain. But as the patient left the hospital seven months after his accident, the sequel of his case is not given.

"We have hitherto devoted ourselves to a consideration of the differences, which exist between the lesions of different portions of brain, and the particular phenomena which characterize each of these lesions, with the view of establishing an accurate prognosis, and of indicating in a more precise manner, than has hitherto been done, the therapeutic means which are best adapted to their treatment. We shall now proceed to treat of such injuries of the head, as require the operation by trepan; 2dly, of such, on the contrary, as cannot be improved, but may be injured by this operation, in opposition to the assertions of many authors; 3dly, of the treatment necessary in cases of hernia of the brain; and lastly, of the causes of abscess of the liver after wounds of the head."

In elucidation of the first point eight very interesting cases are detailed. In the 1st, a soldier received a ball in the middle of his forehead, which pierced the bone, and, traversing along the left side of the longitudinal sinus, penetrated even to the occipital suture, where it stopped. By means of the crown of a large sized trepan a counter opening was made in the occipital bone, the ball was extracted, and a large quantity of clotted blood, mixed with purulent matter, escaped by the opening. The cure went on uninterruptedly, and the patient recovered. In the 2d case the ball penetrated the scull at the left parietal bump, grazed the internal surface of the parietal bone, and lodged about half an inch from the occipital suture. The trepan was applied over this latter part, the ball, which was partially encrusted with bone, was removed, fifteen days passed without being marked by any disagreeable symptoms, and had not the patient been unexpectedly seized with fever, there was no reason for anticipating any other than a favourable result. "These two cases," says the Baron, "prove, in opposition to the generally admitted opinion, that to search after foreign bodies within the cranium is not always a useless nor even a dangerous practice, when it is done prudently and with adroitness." In the 5th case a cuirassier was struck on the head by his horse, which had been newly shod. The stroke was so violent as to fell him to the earth, deprive him of sense and envelop him in blood. He was, however, immediately removed to the hospital of Gros-Caillou under Larrey's care, who had his head shaved and examined the wound, which was found to occupy the superior part of the right temple. The soft parts, covering this region, were divided for the space of two inches and a quarter, the temporal portion of the frontal bone was fractured, and some splinters of it were depressed. As, however, there were no symptoms of compression present at this period, the author contented himself with cutting freely down upon the injured bone, so as to expose the fracture—with detaching, by means of the rasp, that part of the pericranium which covered the fractured bone—with tying a few branches of the temporal and frontal arteries which bled, and with dressing the wound with adhesive plaister, charpee, a square compress and Galen's bandage. The patient was bled from the arm, sinapisms were applied to the feet, ice to the head, and cold diluent drinks were freely ordered. During the night he was bled from both the jugular vein and arm, and on the next day he was comatose and laboured under hemiplegia of the left side. The pulse was small, and so slow as to number 45 strokes only in the minute; the bowels were confined, the bladder was incontinent, and the feet were cold. The dressings being removed it was attempted to raise the fractured portions of bone, but in vain, and the trepan was determined on as the only remaining hope. The fractured bone and about a spoonful of black blood, which had been effused between the dura mater and cranium, were removed by the operation, and scarcely had it been finished when the patient was able to reply to any questions addressed to him, his pulse rose to 55, and in a few hours afterwards his hemiplegic symptoms disappeared. The hole made in the scull by the crown of the trepan, was filled with fine washed sponge—a practice which the Baron always follows;—light dressings were placed over it, and the remedies in former use were continued. On the ninth day all danger was gone, and he was afterwards presented to the Academy of Surgery as a man indebted for his life to the operation by trepan. The 7th case is very interesting, as strongly confirmatory of Larrey's doctrine, that "the trepan should be immediately employed in all fractures of the bones of the cranium, attended with depression of the fractured portion, injury, or depression of the dura mater and brain." It is, however, so long, and so much important matter still remains unnoticed, that we can thus merely draw the attention to it while passing.



Most authors have been unfavourable to the practice of applying the trepan over the frontal sinuses, as well as along the track of the meningeal arteries, on account of the indeterminate depth of these cavities, and the aerial fistulæ which they conceived afterwards to occur and fancied to be fatal. The author has, however, deviated from the old and ordinary custom, and has adopted this practice in two cases. The operation in each case was followed with success.

In defence of his second proposition—that the trepan is not only useless, but injurious in some cases where it is very generally recommended—he observes that—

"Already, while considering the first proposition, we have specified, as one among the most serious exceptions to the operation by trepan, cases in which strange bodies, although introduced into the cranium, lose themselves in the substance of the brain. Of a similar nature are all those cases, where effused fluids either lie at a great distance from the cranial vault, or whose seat is entirely unknown. The trepan is likewise inadmissible in all wounds of the head, complicated with fracture of the skull, it matters not how extended the fracture, or how multiplied its rays, if the fractured portion of the bone be not depressed, and if no foreign body nor symptoms of compression appear. The cerebral disturbance is generally less in extensive wounds, attended with loss of integument and fracture of the bone, because the effects of the percussion are more confined to the external parts, especially when the stroke is directed in the diagonal of the cranial vault. In consequence of this circumstance the internal organs are saved, absorption of the effused fluids proceeds more rapidly, the fractured pieces of bone gradually re-unite, and the patient gets well by the unaided exertions of his own constitution. In such a case, therefore, the trepan, without doing any good, can only retard the cure."

Without attempting to give a definite solution to the question, whence arises *hernia of the brain*, Larrey observes that, when a portion of the brain is exposed by the trepan or an accidental fracture and removal of bone, it is deprived of that support and pressure which are natural to it, and in consequence of its spontaneous expansion, from its innumerable blood-vessels, this portion of brain tumefies, gradually rises through this artificial opening, and ultimately appearing at or above the surface of the bone occasions hernia. This extra-cranial portion of brain then begins to increase, and soon exhibits all the properties of vital erectility, refuses to be checked

by compression, or to be controlled by the knife. If compressed, excruciating pain is generally produced in the region of the wound, and if long-continued, vomiting, convulsions, and syncope supervene. If amputated, the cut surface soon furnishes a fresh exuberance, which is merely encouraged in its reproductive process by repeating the amputation. In treating all such cases of disease, it is indispensable to consider that extensive hernia of the brain is one of the most formidable accidents which can accompany wounds of the head, and that those rarely recover who are attacked by it. The existence of hernia implies an extremely irritable state of the pia mater and cerebral vessels, as well as of a deep-seated inflammation in the substance of the brain, which it is difficult, if not impossible to remedy. With the exception of a single case, in which the extra-cranial portion was small, the Baron observed that all whom he ever saw with this affection perished, and the treatment which he recommends is, we fear, little calculated to encourage his readers to form a more favourable prognosis. It consists in—

"Applying to the protruded portion of brain a piece of fine linen, moistened with oil of camomile slightly camphorated, and in removing every cause of excitement, whether external, or within the scull. With this view it is necessary to extract with proper care all foreign bodies, to preserve the injured parts from the air, to prescribe an antiphlogistic regimen, and to employ such dressings as are mild, and cannot by their weight exercise any injurious pressure. When the encephalocele is susceptible of reduction, Nature then aided will herself gradually effect it, and the protruded portion of brain will gradually re-enter the interior of the cranium, like the epiploon when it has escaped through a wound in the abdomen."

Why abscesses of the liver should so frequently succeed to injuries of the head, is a question which has been often agitated, and perhaps never yet satisfactorily answered. According to some they are regarded as accidental complications, having no etiological connexion with the wound of the head, but the majority have been disposed to ascribe them to the concussion and violence sustained by the liver at the moment the injury is inflicted upon the head. This latter doctrine is supposed to be defended by many arguments, and perhaps by none more strongly than by the fact, that such abscesses seldom or never occur when the wounds have been produced by a cause, which confined its operation exclusively to the head, whereas they usually succeed to injuries, which have been inflicted with so much violence as to agitate and disturb the entire system. Larrey is, however, equally opposed to both these views, and is disposed to ascribe to sympathetic irritation of the liver those purulent formations, which occasionally complicate injuries of the head. He has often had occasion to observe, that the pulmonic and more especially the biliary systems were disturbed in their functions, and seriously affected by inflammation of the fibrous membranes of the head, or extremities, particularly of those which correspond with the organs situated on their side. The irritation, established in some portion of these membranes, rapidly propagates itself by sympathy, and the viscera, which are supplied by nerves from the great intercostal seems to be most obnoxious to the effects of this sympathetic irritation. The vital properties become disturbed, inflammation more or less rapidly appears, abscess at length forms, and when once formed co-operates with the original injury in effecting the patient's downfall.



But it is not exclusively after injuries of the head that these disorders in the hepatic organ arise. According to the present writer they are equally frequent after wounds of the ginglymoid joints of the extremities; and neither is the liver the only organ in which abscesses form after wounds of the head, for every other viscus, whether in the chest or abdomen, may also receive the communicated irritation, and present analogous derangements. The conclusions, then, to which the Baron arrives are—

"1st. That these abscesses rarely recognize, for their essential cause, any direct violence inflicted on the liver by the fall of the individual, or from the action of any body, which may have struck the right hypochondre. 2dly. That the cause of these abscesses after injuries of the head should be referred to the sympathetic irritation, which this organ receives from the inflammation established in the fibrous membranes of the cranium, or of the bones of the upper and inferior extremities, especially of those of the same side, and to a metastasis of the *ichorous miasmata*, or acrid fluids to this organ: and 3dly. That these communications of morbid principle between the liver and part originally injured are more easily effected, when they are not obliged to traverse the median line of the body."

Passing over the author's section on *Apoplexy*, as it contains nothing of importance, *Injuries and Diseases of the Cerebellum* are the next subjects which are treated, and perhaps there is no portion of the volume which merits more attention. Experience has taught the Baron that active inflammation of the cerebellum, whether arising spontaneously or by accident, is constantly followed by an exaltation of the animal and organic sensibilities, without producing the slightest disturbance in the intellectual operations. When one only of its lobes is inflamed, this increase of sensibility is manifested in the same side with the injury, lively pains are felt in the occiput, horripilations, contractions of the muscles of the face and of the two extremities belonging to the wounded side, with a sort of painful formication in the toes and fingers are complained of. Vision is often disturbed, the horizontal position is preferred, forced extension of the spine produces convulsions and sometimes alarming syncope, and these tokens of deranged sensibility are more frequently manifested in the posterior than anterior surface of the body. If the inflammation terminate in suppuration, it is generally established immediately beneath the pia mater. The arachnoid loses its transparency and becomes thickened, but is without any red vessels; and by degrees the purulent matter extends into the proper substance of the cerebellum, and ultimately as far as the arbor vitæ. Feverish excitement, with transient apyrexial intervals, a dull and fixed pain in the occiput, a sense of weight in the head, loss of hearing in the affected side, absence of speech or difficult pronunciation, are among the most frequent symptoms, by which this morbid condition is recognized. If the cause, which alters the substance of the cerebellum, does not compress the nerves of the medulla oblongata, there is no paralysis, and the genital organs alone receive the effects of this morbid state; and should even the patient recover, which is a very rare occurrence, he is ever after annoyed with a feeling of excessive tenderness in the nape and occiput, asthenia of the genital organs, with atrophy of the testicle which corresponds to the diseased lobe of the cerebellum, or of both testicles, if the whole of this portion of the encephalon be affected.

Singular as these effects of diseased cerebellum upon the organs and functions of generation must appear, it is still more remarkable to observe the influence which diseased testicle exerts upon the growth and development of the cerebellum. If the Baron's statements and cases are to be depended on, and they are not quite solitary nor unsupported, it would appear that these organs—the cerebellum and testicles—act and re-act on each other, that disorder or disease in one disorders and deranges the other, and that the effects thus mutually exerted are in a direct ratio to the extent and inveteracy of their disease.

"The genital organs seem to have a marked influence upon the cerebellum, for when they are removed by disease, or any other means, the occipital region of the cranium and cerebellum gradually experiences such a sensible reduction, that the occipital bumps, which had been more or less protuberant before, disappear, and the whole occipital region of the head is diminished in proportion. We have verified this change of dimension in a great number of soldiers, who had been operated upon for sarcocele, and when one testicle only was removed there was only a reduction of that portion of the cerebellum and occipital bump, which belongs to the same side, with the extirpated testicle."

A soldier, who had been wounded in the occipital region by a splinter of wood, was attacked with all the symptoms of inflamed cerebellum, and, in despite of every thing which was done, they were only dissipated by the appearance of an abscess in the nape, which opened spontaneously. In about three months after the accident he rejoined his regiment, and many years elapsed before he again came under Larrey's notice. He was then so extremely altered in appearance, that the author mistook him for a young conscript, who had been exhausted by some asthenic disease. He was 32 years of age, of middle size, but thin and pale, his eyes were depressed, his lips blanched, his hair, more especially that which covered his occiput, was thin and bristled, and a feeling of pain and coldness was always experienced in the back part of his head. He was beardless, his voice was feminine, and as some of the assistants were not without suspicion of his sex, a more minute examination was considered necessary.

"To our great surprise, (says Larrey,) we found his genital organs reduced to the size of those of an infant some months old. His penis was not more than five or six lines long, and two or three lines thick, it never exhibited any degree of erection, and his testicles were so wasted as scarcely to equal in size a small bean."

A Swiss soldier of the guards, named Granfort, fifty years of age, was received into hospital for an erysipelatous affection of the left side of the face, attended with habitual pain and weight of head, deafness of the left ear, and a great difficulty of speech. The pulse was febrile and the strength was much reduced. These symptoms were occasioned by a fall, which this man had sustained a few days before the appearance of the erysipelas. Emollients were externally applied; diluents and anodynes were internally administered. After some days fluctuation was felt, and a deep incision discovered a large abscess in the neighbourhood of the left mastoid process, which was denuded and carious in one point, where a communication had been formed between the internal ear, which was the seat of the abscess, and the external surface upon which it pointed. Five or six weeks afterwards the walls of this abscess were clean and began to heal; still, however, pains in the occiput, a sense of weight in the head, and considerable difficulty in keeping the head from falling towards the affected side, were complained of. He seldom spoke, and when he did he articulated badly. The integuments covering the occiput were very sensible, the arm and hand of the left side were threatened with palsy, but his mind was completely undisturbed. After two months convalescence this soldier fell into a state of lethargy, and died twenty-four hours afterwards. On inspection the dura mater appeared of a deep brown, the arachnoid was opaque and in some parts of a dull white, these membranes and the cerebral mass were filled with turgid blood-vessels, the consistence of the brain was firmer than natural, the lateral ventricles contained some colourless fluid, three spoonsful of pus were found in the cerebellum, the right lobe was diminished, and the medullary substance forming the arbor vitæ was dense and of a grey color. The purulent matter was effused underneath the pons varoli and into the lambdoidal fossa, where the carious opening lay which communicated with the internal ear, and around which the membranes had contracted adhesions. "The scrotum and penis were so reduced from their primitive volume, that one might consider them as being in the second stage of atrophy."



John Baptist Dandé, aged 26, of a scrofulous habit, who had been formerly under treatment for diseased spine, was attacked with pains in the left testicle, which swelled and obliged him to apply for relief. It was at first regarded as a consequence of suppressed gonorrhœa, although the soldier denied that he ever had any syphilitic symptoms, and he was treated in accordance with this view. The tumefaction of the testicle increased however, and extirpation of this organ was at length determined on. After two months the cure was supposed to be complete, and Dandé rejoined his regiment; but in about six months afterwards the other testicle became attacked with symptoms of a similar character to those which had been experienced formerly, and every effort to resolve the swelling and to save the organ being made in vain, the appearance of symptomatic fever and other malignant tokens of inveterate disease suggested the necessity of a second operation. No disagreeable symptoms followed—

"But, one remarkable thing is, that the nape now appears sensibly depressed, that the occipital bump, corresponding with the testicle first amputated, is much smaller than the right. The body is likewise emaciated, the beard and mustaches are nearly fallen off, and, in fine, it is obvious that the total loss of the genital organs has had a very marked effect upon the cerebellum, since the occipital region offers a profound and anormal depression—the consequence of atrophy, which also affected all the bones of the scull, the skin covering the face, and the beard."

These are most interesting cases, and the physiological as well as practical inferences, which arise from them, are of the first importance. We regret that space does not permit us to extract three or four others, which are of the same description; but we think that the intimate relationship which exists between the cerebellum and generative organs, both in health and disease, is incontestably established. Before leaving this subject we may observe that, from some experiments which have been made upon inferior animals, there is reason to believe that the decrease, which the occipital region suffers by castration, is sometimes attended by a corresponding in-

crease in the frontal region. How far this anterior augmentation of cerebral capacity is connected with and influences the intellectual functions, the nature of the animals, which have formed the subjects of experiment, prevents all but the phrenologist from hazarding a conjecture.

Larrey's theory of *nostalgia* is novel. According to him the mental faculties are always the first affected in this disease and derangement of the senses follows. The head gets warm, the pulse becomes strong, the eyes red, the speech precipitate and inaccurate, dull pains are felt in different parts of the body, and the bowels are constipated. To this feverish state succeed symptoms of compression and collapse; and, finally, asthenia declares itself with sad prostration of every mental, moral and physical faculty. On inspecting the bodies of those, who have died of this disease, the Baron has found the surface of the anterior lobes of the brain inflamed, with points of suppuration of variable extent. The arachnoid and pia mater were in a similar state, the cerebral substance was hardened, and its vessels were filled with black blood. The lungs were engorged, the cavities of the heart were occupied by black coagulated blood, the stomach and intestines were distended with gas, their mucous lining was injected, but not inflamed. Ossification, he thinks, of the sutures of the cranium and of the arteries of the encephalon predisposes to this disease, and its proximate cause he is inclined to ascribe to chronic cephalitis, gradually developed under the influence of a strong moral affection. The celebrated Fourcroy died of this distemper, and Lord Byron is supposed by Larrey to have sunk under a form of fever, which seemed to hold its seat in the brain, and to have a strong resemblance to nostalgia. The necropsy of Byron is similar, no doubt, to that of the nostalgic dissections which he gives as marking this affection. The thickened and suturless scull, the firm adherency of the dura mater to its internal surface, the injected condition of the cerebral vessels, and the large quantity of serum which occupied the cavities of the brain—are all indicative of cerebral action; but it is well known that this illustrious man always expressed himself happier when at a distance from his country, than when at home.

For the treatment of this wretched and obstinate affection the author recommends moderate depletion, constant occupation both of mind and body, variety of business and amusement, change of scenery, enlivening music and agreeable society. Vigarous, a Professor at Montpellier, was accustomed to cure all our hippish countrymen, who consulted him, by enjoining them to take active exercise, and by giving them medicated *placebos* at an extravagant price. Our German Spas, our Cheltenhams, and our Buxtons owe much of their efficacy on invalid constitutions to the pure air, active exercise, agreeable society and total relief from anxious occupations, which such places furnish to the invalid; and even a trip to Gravesend, or a walk to Richmond is often more efficacious than the prescriptions and purgatives of half a year.

Some curious physiological observations are made on the nerves of animal or exterior life, and on the resemblances which are observable between them and the *electrical telegraph* of Soemmering. This telegraph consists of about 35 fine metallic wires, which are connected and communicate with what Soemmering calls the *interrogator* and *respondent* of the instrument. The *interrogator* is composed of a series of horizontal metallic



cross bars, separated by equal distances, and distinguished by being marked at one end with the different letters of the alphabet. Each of these bars has at one of its extremities one aperture, large enough to admit the points of two electrical conductors, and another much smaller for the passage of a metallic wire. These wires, at first separated at their points of insertion, and isolated in their whole extent by threads of silk, are afterwards brought into juxta-position and variously intertwined, so as to form one common cord; and, after running along for some space in this form, they again separate, diverge and anastomose or articulate with points of gold, which are vertically placed in a square glass vessel, filled with pure water, which is called the *respondent*. The same letters, which mark the cross-bars of the interrogator, are also placed over these points of gold in the respondent. When electric or galvanic fluid is transmitted by means of the two conductors, coming from the two poles along these metallic wires, it is prevented by the intermediate silk threads from passing through one wire to another, and goes directly forward to render itself at the corresponding gold points in the respondent. The electricity, which issues from the negative pole, disengages hydrogen from the water in the jar, and that proceeding from the positive pole produces a similar disengagement of oxygen. These gases, rising in bubbles to the surface of the water, are received into gazometers, so that it is easy to determine the nature and the quantity of the gases generated in a given period of time. Now, says Larrey, the nerves of animal life are disposed in the same manner, and present in their functions analogous phenomena. For example, the seventh pair consist of two distinct nervous cords. The auditory portion arises by two or more small fibrillæ, from one part of the brain; the facial portion arises from another. The former, more elevated towards the positive pole of the medulla oblongata, is destined to form the organ of hearing; the latter, being nearer the negative pole, is destined to supply the muscles of the face with motive power and the skin and glands with sensibility. A similar disposition holds with the lingual nerve, of which one part serves for taste and another for speech, each having a different origin. The branches of the median nerve, which supply the muscles of the arm, fore-arm and hand, do not arise from the same part of the spinal marrow with those which it sends off to endow the skin with sensibility. The neurilema acts the same part to the nervous fibrillæ, which the silk threads do to the wires of the telegraph; and the common membranous sheath, which surrounds the nervous trunk, represents the silk ribbon which envelops the metallic cord of this instrument: so that the electrical telegraph of Soemmering, according to Larrey, may be styled the *simulacrum nervorum*.

"All this proves that the intellectual and sensitive functions are executed by distinct agents, which give different results, although they communicate and sympathize. Thus, we shall suppose that the nerves, which arise from the negative pole of such or such a pile, give motive power to the muscles or conductors which are of a stronger and more active principle. To take for an example the pile of the medulla oblongata, which has for its base the centre of the medullary substance of the brain, I believe that all the nerves of sensation arise from the superior part of the positive pole, which in Soemmering's telegraph disengages oxygen—such are the olfactory, the auditory, the optic nerves. Whilst those, which supply functions requiring greater intensity of power, such as those of the muscular tissue, take their origin from a more inferior part of

the medulla, or towards the negative pole, which in the telegraph produces hydrogen."

How much truth is mixed up with this theory of the differences between nerves of sense and motion, it would require more time and consideration to ascertain, than the present place can furnish; but we cannot but express regret, that not the faintest allusion is made throughout all this discussion to the ingenious discoverer of the differences themselves. Larrey has, surely, no reason to harbour jealousy against either nations or individuals. He has been amply rewarded by his country for his zeal and success in advancing surgery; and he will not the less enjoy the harvest of his labours, by respecting the claims of Bell, or any other celebrated exotic, whose improvements are not the fewer, because their remunerations have been more economically awarded.

After a few observations on some lesions of the ear, and a rather operose description of the conjunctiva of the eye, the author divides the morbid alterations, which the globe of the eye sustains, into such as are produced by concussion, and actual solutions of continuity.

A brigade officer, during the battle of Aboukir, was struck by a ball on the external side of the right orbit, which so disturbed the right eye, without injuring the external skin, that it was wholly deprived of its visual faculty. A severe pain was felt at the bottom of the orbit, followed by weight of head, effusion of blood into the chambers of the eye, and engorgement of the conjunctiva. After topical bleeding and other local measures, Larrey gave exit to the extravasated blood within the eye by an operation; the patient immediately saw the light without being able to distinguish objects, every symptom gradually disappeared, and the cornea healed without opacity, or any sensible deformity.

The following case is very singular. Pêcheur, a serjeant in the Royal Guards, received so violent an injury on the left eye by a fall, that the globe of the eye was burst, and the crystalline lens, together with the aqueous and vitreous humours, were forcibly expelled. The palpebræ were ecchymosed, the conjunctiva was red and bloated, and the lower part of the cornea was separated from its attachment to the sclerotic by an irregular cut, through which a portion of the iris protruded. The parts were washed, the iris was carefully returned, the divided edges of the cornea were approximated, the eyelids were drawn close and retained so, and a quantity of blood was drawn from the temporal artery. Ice to the head, sinapisms to the feet, constant darkness, and a rigorous diet were enjoined. During the night a second bleeding was practised, and the next day cupping-glasses were applied to the nape and between the shoulders.

The Baron had very naturally, it will be admitted, considered this eye as lost, or at least for ever deprived of the faculty of sight; but, *a notre très-grande et agreable surprise*, the globe gradually refilled, on the 22d day the cornea began to assume a healing aspect, and in about six weeks it was perfectly cicatrized. The natural form and almost ordinary volume of the organ were restored, and by the aid of a very convex glass this soldier came to see objects distinctly, and continues to discharge all the duties of his office. "This very curious case evidently proves, that the vitreous humour, although in greater part lost, can be regenerated," and that the crystalline lens may be dispensed with!



It has been very generally believed that the *iris* derives its contractile power from the influence of the optic nerve, or retina, and hence has it been recommended not to operate for cataract, especially when extraction is necessary, if the iris appear motionless. The author, however, opposes this doctrine by arguments numerous, if not convincing, and contends that the properties of this membrane depend exclusively on its own texture, and on the ciliary nerves which are sent to it from the lenticular ganglion of the great sympathetic. Cases of amaurosis, he argues, are met with in which the iris retains its contractility—wounds inflicted on the nerves, by which its mobility is supplied, have palsied this membrane, while the faculty of sight remained unaffected, and belladonna suspends its contractility without disturbing any other function of the eye;—these and other arguments, which are illustrated by cases, but to which we can only refer, are urged by Larrey to prove that the iris is independent in all its functions of the optic nerve.

*Ophthalmia*, and especially the endemic ophthalmia of Egypt, is the next disease treated of. With the exception of the gonorrhœal form of this disorder, he strenuously contends for its non-contagious nature, and considers it important both to the interests of science and to public tranquillity, to dissipate any impression which may exist of a contrary character; and with some ingenious remarks upon the causes, varieties and treatment of *epilepsy*, he concludes one of the most interesting and valuable volumes, which for a long time we have had the pleasure of perusing. As opportunity offers, we shall not neglect to draw the attention of our readers to the remaining portions of the *Clinique Chirurgicale*; and should we find them executed with the same talent and success, by which the present is characterized, the name of Larrey, justly honoured and highly exalted as it already stands, will go down to posterity with purer claims on their esteem and gratitude, than any which can be presented by that of the mighty and almost masterless conqueror under whom he served.

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## II.

## WELLESLEY FEMALE INSTITUTION.

REPORT OF THE WELLESLEY FEMALE INSTITUTION. By *Samuel Cusack*, M.B. Assistant Surgeon to the Institution for Diseases of Children.

[Dublin Hospital Reports, Vol. V.]

THE business of the above institution is conducted by a superintending accoucheur, assisted by competent pupils who reside in the establishment, recourse being had occasionally to consultants. The number of labour cases since the opening of the institution (the time not stated) up to the end of 1828, was 398, out of which, three cases only required instrumental aid —one the forceps, two the perforator. There were twelve cases of preternatural labour—four, where the upper extremities presented—eight, where

the breech or feet presented. In all the four, where the upper extremities presented, turning was performed—and all the lives of the mothers were saved. In two, the children were still-born. In one case, the contraction of the uterus was so violent, the hand was obliged to be withdrawn, and 120 drops of laudanum exhibited, after which the operation was performed with facility.

In presentations of the lower extremities the mothers were all saved, and the only instances where the infants were sacrificed were those where the head had been jammed in the pelvis by ill-directed attempts at extraction previously to admission. These cases were almost entirely left to themselves till the breech was expelled, when the usual attention was paid to insure that the face of the child should be turned towards the sacrum of the mother. After the extraction of the arms, the chin was depressed by placing the finger in the mouth of the child in the usual way, so as to give the head the direction of the axis of the pelvis, and to cause the biparietal, instead of the occipito-mental, to be the moving diameter.

"In five cases the funis was protruded. In some of these cases the pulsation had ceased previous to application for assistance; in the others none of the means recommended in such cases for the preservation of the child appeared admissible. Of six cases of puerperal convulsions, two occurred between the fifth and eighth month; in one the fits were always induced by constipation of the bowels, and after this cause was removed, did not re-appear. One case occurred after parturition; the cause was similar to that of the preceding case. The patient recovered under the employment of venesection, and purgatives; of the remaining cases of convulsions, all of which occurred during labour, one patient was delivered by turning, during which operation the fits were suspended, but recommenced after delivery, and carried the patient off. Another was delivered by the crotchet, who recovered from the convulsions, but subsequently died of peritonitis. In another case (a first pregnancy) the convulsions appeared at the commencement of labour, the membranes were ruptured by the finger, twenty ounces of blood taken from the temporal artery, cold applied to the head, and injections and purgatives administered. The fits however continuing, the forceps were applied when the head was sufficiently low, and mother and child were both saved.

The convulsions appeared in one instance about twelve hours after the birth of the first twin, the woman having been improperly allowed to remain undelivered of the second all that time. The forceps were promptly applied, and the second child extracted without difficulty, but dead. In this case, instead of the patient being comatose between the fits, she exhibited all the symptoms of delirium ferox, the birth of the second child not seeming to have any effect on her condition, but after the extraction of the placenta she became perfectly tranquil, and the fits did not again appear." 498.

In a recent case which the author attended with Dr. Nicholson, and where eight fits of well-marked convulsions occurred in the course of twelve hours, the os uteri was found dilated to the size of a half-crown, the head presenting, and the membranes ruptured. By means of copious bleeding, shaving the head, and cold applications, with the internal use of scammony and calomel, and lavements, the convulsions were completely subdued, and the patient was delivered naturally of a dead child, after an interval of thirty hours, during which she remained rational.

"This case contrasted with one already related, where the convulsions had ceased on the delivery of the patient by the perforator, but in which fatal peritonitis supervened, would lead us to conclude, that artificial delivery ought to be limited, except when the pelvis is deformed, to those cases where the forceps can be used, and that turning, or the perforator, should be employed only in those cases where, from the condition of the parts, there appears no risk of exciting inflammation: indeed unless there be strong proof of the death of the child, or we have to deal with a narrow pelvis, it does not seem that under any circumstances is the use of the perforator justifiable. There can be no doubt that convulsions will often cease on artificial delivery being performed, even though in a rude violent manner, but the result in such cases usually is the death of the patient by peritonitis." 500.



The author considers that opening the bowels is not of less consequence in the treatment of puerperal convulsions, than bleeding. Cold to the head is a very powerful auxiliary.

There are cases, he believes, where the disease is the result of nervous irritability rather than of plethora, and, in such cases, the too free abstraction of blood will only hurry the disease on to a fatal termination.

Hæmorrhage occurred in six cases during labour, caused by the attachment of a small portion of placenta over the os uteri. In all, it was arrested by the rupture of the membranes. In fifteen cases it was deemed necessary to remove the placenta by the hand. The number is large but is accounted for by the fact that many of them were cases where assistance was called for on account of retention of the placenta alone, the consequence of previous mismanagement. In five out of these fifteen cases, there was hour-glass contraction of the uterus. In one only was there any difficulty in the removal of the placenta, where, co-existent with the stricture of the uterus, there was violent uterine action, and high excitement, both nervous and vascular. Venesection and opiates were employed previous to any attempts at extraction. These, however, did not lessen the difficulty of the operation, and the patient died of venous hæmorrhage ten minutes afterwards.

"In five cases hemorrhage occurred previous to the delivery of the placenta. Two of these cases were of hour-glass retention: in one sudden death took place about six hours after delivery, although the placenta had been removed without difficulty, and the patient appeared to have completely recovered from the loss of blood, which had not been at all extensive; no hemorrhage occurred externally, nor on the post mortem examination did any appearance present itself sufficient to account for her death. The uterus had contracted well, and no coagula were found in its cavity." 502.

A few hæmorrhages after the delivery of the placenta were arrested by pressure over the uterus, the application of cold, quietude, and fresh air.

"A considerable number of abdominal inflammations presented themselves; at particular periods they were exceedingly prevalent; at other times equally rare. The type of these inflammations varied with the periods of their appearance. In December and January, 1827-28, the peritoneum seemed to be the structure most deeply engaged, and the inflammation to be of a phlegmonous character. In March the disease assumed the low typhoid character. In May, 1828, several cases were met with in which the intestinal mucous membrane was the seat of disease; they were characterized by thirst, redness of tongue, or white coating with florid papillæ interspersed, intolerance of light, headache, and obscure abdominal tenderness." 503.

Cases of abortion were very numerous. Relief was sought, in some cases, for hæmorrhage, in some, for retention of part of the ovum—in others, for

derangement of general health consequent on the miscarriage. Hæmorrhages were easily suppressed by the usual means. Excepting after the sixth month, manual extraction of the placenta was not attempted. Enemata, purgatives, friction of the abdomen, and binding were the means employed for expulsion.

"Amongst the most frequent of the diseases of females, were those connected with the function of menstruation. In the treatment of these cases more attention was paid (with some exceptions) to the constitutional, than to the local symptoms, and what are considered specific or directly emmenagogue medicines were but rarely exhibited, and never found effectual. The catamenial derangements consisted in total suppression, in diminution, in excess, in irregularities attendant on their final cessation, and in distressing accompanying symptoms.

These states were accompanied by two very opposite conditions of the system, debility and plethora. In the former, the object principally held in view was to improve, as much as possible, the general condition of the system; in the latter and less frequent condition, depletion, either topical or general, was employed." 504.

Cancer uteri was often met with. In all instances, the disease was so extensive as to engage all the soft parts in the neighbourhood of the os uteri:—thus shewing that extirpation of the uterus, at that period of the disease, was totally inapplicable.

"Some instances occurred in which the os uteri was tumefied, irregular, and tender to the touch, accompanied by a muco-sanguineous discharge, by pain about the back and thighs, anasarca of the lower extremities, loss of appetite, debility, and sallowness of the countenance. They were treated with alterative doses of the pil. hydrargyri, followed by mild saline purgatives combined with bitters; strict attention was paid to their general and dietetic management, and in every instance a perfect, though in some a gradual, recovery ensued." 505.

The above is an important fact, and points out the necessity of strict investigation, before we condemn, as malignant, cases that may be only obstinate or tedious—and thus submit patients to the hazard of a dangerous, often an unsuccessful operation.

Two cases of polypus uteri occurred, in which the patients were reduced to a state of great debility. The tumours were removed by the ligature, and the patients recovered perfectly.

"In one case of polypus uteri, where the patient had been exceedingly debilitated, the pulsation of the large vessels about the neck was visible at a distance for some months, so that, on a superficial inspection, she might have been supposed to labour under disease of the heart." 506.

Mammary abscess was frequently arrested in its progress by the exhibition of emetic tartar. The secale cornutum was employed in 12 or 14 cases. In six it produced no sensible effect; but there was reason to believe that the medicine was not good. In three instances, where the dose was half a drachm at a time, apoplectic symptoms ensued.

"In a case of breech presentation, in a female who had borne several children, ten grains of ergot, given in infusion, were administered; she had not had any pains for the entire of the preceding night. Pains, however, came on so immediately after the administration of the ergot, as to leave no doubt on the author's mind of its efficacy in that instance. Amongst other instances, a case was treated by Mr. Dashwood, an extremely intelligent pupil, where the placenta,



after three hours' retention, was expelled by uterine action consequent on the administration of the ergot, though in the two preceding deliveries of the same patient the placenta was extracted by the hand." 508.

One case of severe puerperal inflammation of the joints occurred. The placenta had been removed in consequence of hæmorrhage, and the patient was going on favourably till the 7th day, when she was attacked with febrile symptoms and inflammation of the knee and ankle of one leg. The fever was of a mixed character, accompanied by much gastric derangement and acceleration of the pulse, without hardness. The pain in the parts preceded the other symptoms of inflammation; but, in a short time, the joints became red and swollen, the calf of the leg participating in the tumefaction. The pain was so violent as to deprive the patient of rest, and to require large opiates. Calomel, opium, and emetic tartar to ptyalism constituted the principal means of cure, with frequent application of leeches. Sulphate of quinine, with compound tincture of gentian was found useful towards the close of the malady. "*In no stage whatever of the disease were any symptoms of venous inflammation discernible.*"

"Two cases of hydatids of the uterus were treated; both of the individuals were married, and one had previously children, and experienced, with the exception of feeling the movements of the child, the usual symptoms of pregnancy. One patient had a constant discharge of a yellowish colour; the other was free from any vaginal discharge till a few days before the expulsion of the hydatids, when there was a slight discharge of blood. In one instance the hydatids were expelled without much accompanying hemorrhage; in the other, there was a considerable loss of blood. The patients were treated, after the expulsion of the hydatids, like puerperal patients; one of them had a considerable quantity of milk in the breasts for a few days, and has since borne a living child. The hydatids expelled in one case amounted to upwards of a gallon; they were of an elliptical elongated shape, connected together by delicate pedicles, and surrounded by a cyst, resembling the decidua." 512.

One patient had a malignant tumour of the os uteri. Five months previous to application she was in good health. She had borne several children.

"On examination per vaginam, a tumor, as large in circumference as a dollar, but much thicker, was found growing from the lower part of the cervix uteri. It was firm and elastic, and a portion of the cervix uteri could be felt above the tumor, apparently free from disease. After endeavouring as far as it was possible to improve the patient's general health, a ligature was applied as high up as the cervix uteri, by means of the common double canula." 513.

In the progress of the case the ligature was tightened occasionally; but, on the 16th day, the cervix uteri, not being completely divided, was drawn down, and severed across with a bistoury. For upwards of a month, the patient appeared to be doing well; recently, however, the ulceration recommenced at the place where the tumour was separated, and all the former distressing symptoms have returned. Still the case is important, as shewing how far the uterus will bear, with impunity, the application of the ligature, there being no threatening of peritoneal inflammation or retention of urine, during the time the ligature was on the uterus. The author, in future, would prefer the knife to the ligature. We must close this review of Dr. Cusack's paper with the following case.

UTERINE HÆMORRHAGE AFTER DELIVERY.

"The patient, a healthy young woman, was much excited, apparently in consequence of having taken some spirits. Her face was much flushed, pulse 130, full and strong; enemata and aperient medicines had been administered without any effect, and no uterine action existed. As the vascular excitement seemed the result of a temporary cause, it was not deemed necessary to have recourse to venesection; and lest some untoward event should occur, it was deemed advisable to deliver the patient; accordingly turning was performed, not without some difficulty, in consequence of the height in the uterus at which the child was placed. It however was born alive, and what was remarkable, very soon became a fine child, while the infant that was born naturally died in a few days.

Every means were taken to promote the safe expulsion of the placenta, which in about half an hour was expelled naturally, and the uterus became hard and well contracted. In a short time however, most violent uterine hæmorrhage came on; cold was promptly applied to the region of the uterus, and pressure made over that viscus, by which means the hæmorrhage soon ceased.

In this instance the patient did not become at all faint, nor was any internal stimulus employed except cold water, and the only effect produced by the loss of blood was the reduction of the pulse from 130 to 90, which also became proportionally soft; a very desirable result. This was evidently a case of hemorrhage resulting from vascular excitement, and shews the necessity of preventing, by attention to temperature, diet, drinks, &c. during labour, so unfavourable a condition of the circulation." 517.

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## III.

THE LIFE OF JOHN WALKER, M.D. late Director of the Royal Jennerian and London Vaccine Institutions. By *John Epps*, M.D. Director of the above Institution, &c. Octavo, pp. 342. London, 1831.

THE name of John Walker is familiar to the ears of the whole profession; and the person of that remarkable individual will be remembered by all those who have been educated at the Borough schools during the last quarter of a century, in consequence of the eccentricity of manners which he displayed in the Physical Society, where he was a very constant attendant —and not seldom the source of considerable merriment. His unwearied zeal, not to say enthusiasm, in the cause of vaccination, and of humanity in general, has also familiarized him with, and endeared him to the hearts of all philanthropists in and out of the profession. The life of this singular personage has been more eventful than that of most medical men—and as delineated in this volume by the able pen of his friend and successor Dr. Epps, forms one of the most amusing and instructive pieces of medical biography in the English language. The interest and the merits of the book would be sufficient passports to public patronage—but there is a still higher consideration in question. The publication is brought forth for the benefit of the widow. The work is dedicated to the WORLD, for whose good the life of Walker was spent and devoted—and it is to be hoped that



the WORLD will make some return by promoting the welfare of his surviving partner.

From a long acquaintance with Dr. Walker, we can well believe Dr. Epps, that there was, "amidst the numerous papers left by him, a chaotic confusion." It must have cost the biographer no small labour to draw order out of chaos on this occasion. But we shall now proceed to exhibit a rapid sketch of this most extrordinary man's life, recommending, in the strongest terms, the whole work to our readers, convinced as we are that they will be well repaid for their time and money, by the treasure of anecdote and the fund of moral and humane sentiment which this volume contains.

Dr. Walker was born in Cockermouth, county of Cumberland, on the 31st July, 1759, where he and the late celebrated Dr. Woodville were school-fellows. Young Walker was the idlest of boys at his tasks—the most active in play. Finding that the master generally took a nap while he was saying his lessons, he hit on the plan of getting a few lines at the beginning and end, thus calculating on non-detection of all the intermediate errors.

"Cultivating this dependence, he learned generally only two or three of the first lines, and a few at the end of the lesson. Before completing the few he knew, the master began to nod. Young Walker kept his eye fixed upon the sleeper, keeping up, at the same time, a humming sound, without articulating a syllable, till the master, giving a greater nod than usual, awoke, when the young rogue repeated the last line of his task and went to his seat. When the honest pedagogue was sufficiently on the alert, the deficiency was detected, and Walker, flagellated, was sent to his form." 5.

Walker's father was a smith and iron-monger in Cockermouth, and after leaving the grammar-school, the son, on mingling in the fracas of the bellows, the hammers, and the anvils, was soon adorned with the insignia of his occupation, the leather-apron, consecrating cheerfully his power to the forge, by inscribing on its entrance the Roman poet's description of the forge of Cyclops:—

"The hissing steel is in the smithy drown'd."

Five years passed away in this manner, the young Walker not doing much, however, of the laborious drudgery, but employing himself a good deal in the mechanical construction of scale-beams, locks, and other pieces of machinery not very complicated in their nature. A temporary residence at his father's house of a broken down tradesman from Dublin inspired young Walker with an ardent thirst for drawing and engraving, in which branches he made some progress. But, in fact, though Walker had a smattering of many things, he had no perfect knowledge of any thing, and found himself, at the age of twenty, "the most helpless of creatures." At this time a sudden resolution seized the mind of young Walker—to enter as a common sailor on board a *privateer!* His father gave him a quantity of scale-beams to dispose of in Dublin, where the privateer lay, and away went the youth in quest of adventures. By the time he reached the Irish metropolis, in 1779, the privateer was captured, and there was a hot press prevailing for men-of-war's men, a situation which Mr. W. did not seem to relish. He therefore settled in Dublin—sold his scales—became acquainted with

some of the young Dublin rakes, and was engaged in many a midnight row and revel. At length he placed himself under Esdale the engraver, and spent four years in the pursuit of engraving, and Walker's Hibernian Magazine for 1780-1-2-3, contain many plates of his execution. Walker excelled in landscape; and while pursuing his studies in this line, he bettered his acquaintance with the dead languages, in which he had hitherto made but little proficiency.

With that versatility and love of change which characterized his whole life, Walker now suddenly turned schoolmaster, and by dint of perseverance, got up a school containing 100 scholars. Walker now became a Quaker in sentiment and religious views, but the Society of Friends would not admit the young candidate within their pale, fearing that he had too much learning to be religious. In the midst of his scholastic struggles, he turned author, and published his System of Geography and his Gazetteer, which made some noise in their day. While constructing these works he was so poor that he could scarcely afford to buy candles whereby to study after school-hours! In 1792 he made the attempt to publish, on a large scale, the second edition of his Geography and Gazetteer, which did not turn out successful, and obliged him to give up his school and come to London, after ten years spent as a pedagogue—one of the most irksome occupations, we should think, to which man was ever doomed!

In London, Walker became acquainted with a navy-surgeon unemployed, and here he took a violent predilection for medical studies—entered himself as a student at the Borough hospitals, though on the wrong side of thirty years of age, and spent three years in the ardent pursuit of professional knowledge. Always desirous of change he went to the Continent in 1797, and visited Paris in the garb of a Quaker, where he was civilly treated, and permitted to ramble about unmolested, and indeed to the great entertainment of the mercurial Parisians. In 1799 he obtained a degree at Leyden, of Doctor in Medicine—and soon afterwards returned to England, where he became united to the object of his affections at Glasgow. Dr. Walker maintained that marriage was a civil contract—not a religious ceremony; and by this doctrine gave still greater offence to the Quakers, who still kept him out of their brotherhood. He now took up his residence in MODERN ATHENS, and studied there for some time, making the acquaintance of many eminent professors, among others, Dugald Stewart, to whose table Dr. W. was often invited.

In 1800 he was invited by Dr. Marshall to accompany him to Naples, for the purpose of introducing vaccination into the Neapolitan states. He took passage in the Endymion frigate, and the voyage furnished the eccentric Quaker with many topics for remark—many subjects of wonderment and admiration. His description of beating to quarters, and clearing for action, in the night, is not bad; though not quite so spirited or faithful as Dr. Epps imagines. It is, however, quite graphic enough for general readers. The Doctors remained at Gibraltar three weeks, introducing vaccination among the military and civil population. From Gibraltar the vaccinators proceeded to Minorca in a Florentine frigate. At Mahon the vaccine virus failed, and they were obliged to send back to Gibraltar for fresh virus, which succeeded. They then visited Malta, and there introduced vaccination. After a short visit to Naples and Sicily, Dr. Walker



proceeded with the English fleet for Alexandria, leaving Dr. Marshall at Malta. Dr. W. was present at the landing of the troops and at the battle where Abercrombie lost his life. He first directed his attention to the relief of the wounded—and then prosecuted his vaccine labours with success. The Pacha of Rosetta made him a present; but it appears that he was scurvily treated by the British Government, and actually wronged out of money which he laid out for the use of the sick. But mismanagement and misrule were too much the order of the day at that time. They are not very likely to return.

We imagine that by proper documents and proper representations, the widow would still receive the trifling sum which ought to have been awarded.

An amusing anecdote is here related of the eccentric doctor.

"Dr. Walker had, as the reader will have perceived, the courage to be singular. He allowed, while in Egypt, his beard to grow, so as to look very like a learned Jew. One of the young and thoughtless friends of his mess drew in chalk the French insignia, so hateful to the Turks, the *fleur-de-lis*, on his big white hat. Rising from dinner, the hat was put on, and, falling into one of his musing moods, the bearded sage wandered through Cairo without any uniform. Conceive his astonishment, when in the midst of his meditations, some Turkish soldiers fell upon him with great violence, believing—notwithstanding all his assertions to them, in an unknown tongue, that he was 'Inglese'—him to be a Frenchman. And let Britain be ashamed of her sons (many of them now, it is true, no longer able to abuse the name of their God), when they read the fact, that the Turks, in order to satisfy themselves whether Dr. Walker was or was not a Frenchman, uttered the oaths, 'God d——,' 'by God,' inferring that, if the subject of this memoir was an Englishman, he would understand a language which they had heard so generally used. Dr. Walker, horrified at the oaths they uttered, especially as coming from strange lips, instead of smiling assent, as they expected he would were he 'Inglese,' shook his head. This they understood as a mark of his not understanding them, and, consequently, that he could not be an Englishman! And the Arnhaut, who had applied this test, smiled triumphantly on his companions at his skill in detecting the Frenchman. They, therefore, seized him and took him to prison to the citadel. The prison doors were before him; and Dr. Walker, thinking that he might be put into one of the dungeons below, where he would, most likely, be never more thought of, gave himself up as one no more to enjoy the delights of home and its social pleasures. Much to his happiness, however, they bade him ascend a staircase, running their bayonets into him and knocking him with the butt-ends of their muskets behind as he ascended. While thus maltreated, and in such peculiar peril, an English patrole happened to be passing, who informed the commanding officer who the bearded philosopher—imagined by the soldiers to be a French *savant*—was, and Dr. Walker once more experienced the sweets of liberty, after enjoying the delicious dish called *killaw* with the officer and the Mussulmans, who accommodated the unbeliever with a low stool and wooden spoon, while they sat cross-legged and with naked hands helped themselves to the savoury mess." 58.

With all due veneration for the Doctor's rigid morality, we conceive that he would have been a very great fool to have sacrificed his life rather than utter the only words by which the ignorant Turkish soldier could distinguish him from the then enemy of their country.

Most men would have shaved off beards that were likely to bring them into so many difficulties. Not so Dr. Walker. "His beard singularised

him; and he loved to be noticed." He entertained also some absurd notion that this ancient ornament protected him from certain cutaneous diseases of the climate. By sleeping in the open air, one night, he was seized with a paralytic affection, which made him anxious to return to his native land. After several personal adventures, not of a very formidable nature to those who have journeyed in foreign lands, but which must have appeared very interesting to a cockney-traveller, Dr. Walker embarked in the El Carmen, and returned to England.

"Delightful indeed did the green fields of England appear to the subject of this memoir, and he would willingly have taken possession of the first boat that came alongside, when anchored at Spithead, to hasten ashore." 68.

But the quarantine was put in force against him and all his companions except Sir Sidney Smith and Col. Abercrombie, who were immediately liberated, in consequence of their despatches, and allowed to proceed to London. The worthy Doctor inveighed against this "distinction of persons;" and certainly it is vexatious as well as ridiculous in a medical point of view—but the Doctor was old enough to know that, in all countries, there is one law for the powerful and another for the weakly—that CONTAGION is only communicable through particular channels—and that the quarantine doctors could prove, by the most irresistible arguments, that the plague might lurk in the *beard* of a WALKER, though quite incapable of taking up its quarters in the *whiskers* of a SMITH or an ABERCROMBIE. The poor Quaker was an infant in medical politics!

After a fortnight's repose at Stonehouse, Dr. Walker repaired to London, and in August 1802 commenced the practice of vaccination at the house of the late Mr. FOX, the celebrated dentist. He soon formed the idea of a public institution. This was soon effected, and called the Royal Jennerian Society. It is a curious fact that his present Majesty, then Duke of Clarence, was one of the first patrons and supporters of the vaccine establishment. Dr. Walker was elected resident inoculator; but some intrigues being called into play and parties formed against him, he resigned the office. The Doctor now appeared to be in a worse state than ever; but some of his friends laid their heads together, and a new society, the LONDON VACCINE INSTITUTION, was the result. It was carried on in Salisbury-court, where all the patients of the old institution flocked. In this state of things, Mr. Rose brought in a bill in parliament for the support of the old or Jennerian Institution, and £.3000 per annum of the public money was voted for that purpose. The life of Dr. Walker, after this, is the history of vaccination, and this we must pass over. The following passage will shew the activity of the Doctor to the hour of his death.

"Dr. Walker, in other words, was the monarch at the vaccine stations. His was the despotism of knowledge; and he delighted in the exercise of this kind of despotic power as much as the autocrat of the Russians does in his. Thus gratified, and impelled likewise by a sense of his duty, by the delight of doing good, and also by the pleasure of cherishing a cause of which he was the principal support, it is not a matter of wonder that he should have never missed a day, from the time when he was appointed till within a week or two of his death, in visiting the stations. It is becoming that these stations, at which he attended, should be noticed, in order to shew to the public the immense amount of service he contributed to the general good. At nine a. m. Dr. Walker was



to be met with at 215, Strand; at quarter past nine, at 337, Strand; at half-past nine, at 29, Haymarket; at a quarter to ten, a. m., 27, Lisle-street; at ten, a. m., at 3, Broad-street, Bloomsbury; at a quarter past ten, at 144, High Holborn; at half past ten, at 63, High Holborn. From that station he went to one of the principal stations, at 1, Union Court, Holborn Hill (still retained by the Society), at eleven; from this he proceeded, at about a quarter to twelve, to 4½, Salisbury Court, Fleet-street, and then returned to his own house, at 6, Bond Court, Wallbrook, where he vaccinated at two, p. m. Besides these journies, on every Monday, he went to the vestry of St. John's Church, Horsley-down, kindly granted for the use of the Society; thence to the Lancaster Royal Free School, 5, Thomas-street, Borough Hospitals; and thence to the South London Dispensary, No. 1, Lambeth Road.

Such was the life of this man of benevolent industry. Day after day he went his round. Sunshine or rain, it mattered not. Vaccination was the longing of his soul; and nothing was sufficient to draw him from his course. Even the days of the annual meeting he did not neglect the stations, although staying a shorter time than usual at each. On such days he always put on a new white hat to meet the Lord Mayor, who, by virtue of his office (being President of the London Vaccine Institution), is chairman on the occasion." 125.

Dr. Walker, however, could not last for ever. The organic machine was beginning to shew that it could not much longer contain the immortal soul. In the month of February, 1830, he was suddenly awoke to a consciousness that he had passed the usual range of human existence (70) and instantly came to a resolution to prepare for death—a preparation which, no doubt, hastened that event. When he determined on any thing, he could not rest till it was accomplished. He wanted some shelves constructed in his cabinet, for the arrangement of its multifarious contents. He went for the carpenter himself, and even carried home the wood on his own shoulders. By this effort he was exhausted—complained of a pain in his side—and a previous cough was increased. He was a sceptic as to all remedies in sickness, and would take no medicine. He got worse; but still went his daily rounds. In the month of June (21st) he went his last round in a cabriolet. He then took to his bed, would take no medicine, and died on the 23d of the same month. In a report of the London Vaccine Institution, ample justice is done to the merits, the zeal, and the unwearied exertions of this singular and eccentric character who, "for upwards of a quarter of a century, never omitted one lawful day going his rounds to the numerous stations of the institution."

The mass of papers, containing observations, reflections, and anecdotes picked up on his travels, have furnished materials for several chapters in Dr. Epps' Biography, all of which will be read with much curiosity. Thus the sixth chapter exhibits Dr. Walker in Paris during the revolution, and discloses many curious scenes of that stormy event. He there became intimate with Tom Paine, Napper Tandy, Thomas Muir, and other distinguished characters that figured on the theatre of the young republic. Of Tom Paine he seems to have entertained a most exalted opinion. The following passage will afford a good specimen of the deliberate JUSTICE which we are to expect under republican institutions, should they again become the order of the day—which is more than probable.

"Among Dr. Walker's notes is a reference to the proceedings of the council of FIVE HUNDRED, in regard to newspaper editors, proceedings showing that though the members were republicans in theory, they were not so in practice.

The council met in the Odeon Theatre. The report of the committee appointed to investigate the character of periodicals was received, and, on the same, numerous individuals, including proprietors, printers, publishers, editors, &c., of opposition papers, were sentenced to deportation to the unhealthy climate of Cayenne, amid the acclamations of the attendants. With a list of nearly thirty different journals, which the committee had reported as anti-republican, the president called out the titles, one by one, with the charge, 'Ceux qui veulent qu'ils soient deportées qu'on s'elevent,' when the members generally made a little move, as if going to stand, and the president pronounced—" Ils sont deportées.' At length the rapidity of such procedure was not in conformity with the organic powers of the president, who called out, on giving a title, 'S'il n'y a point de reclamation ils sont deportées.' All sitting still, the president added—'Ils sont deportées;' and the secretaries recorded their sentence of unlimited banishment.

Sometimes a member rose in his place. The council occupied the pit. The member rising thus addressed the president:—'Citoyen, president, je demande la parolè.' 'Vous l'avez, citoyen,' replied the high officer. The member then stated that he knew well the proprietor and conductor of the journal in question. 'C'est un brave homme, un excellent citoyen, un vrai republicain.' The member further represented that it must have been from some mistake that an anti-republican article had appeared in its pages; that the editor was, perhaps, ill, or out of town, and concluded with demanding that the paper be erased from the list of those proscribed. The member having finished, the president added, 'Ceux qui veulent que les noms des proprietaires, conducteurs, &c. du papier soient erasees qu'on s'elevent.' 'Ils sont erasees.' The pleasing words were pronounced, and thus many individuals at once escaped transportation. This example given, other members took courage, rose in their seats, and succeeded in saving their friends from banishment. However, mercy was not a characteristic of many of the most declamatorily influential of the council. Agalot, Jean de Brie, and others, rushed towards the tribune and prevented the further extension of mercy. They represented that the aristocratic journalists are the greatest of all enemies to the republic; that through these the royalists were emboldened to rebel; that had not they (the council) struck the decisive blow, and seized the conspirators in their midnight machinations at the manege of the Thuilleries, and even at the Luxembourg, breaking up at once the secret confederacy, in twenty-four hours more the republic would have erased, and we all should have been hanged. This appeal to the feelings occasioned the bursting forth of loud shouts 'Vive la Republique,' and the sentences of deportation were hurried on as before." 139.

The political opinions of the Doctor himself were unequivocally democratic; but his religious tenets, or at least the tenets of Quakerism, which he outwardly and perhaps inwardly embraced, induced him to take no active part in politics of any kind.

It is in the 8th and three succeeding chapters, however, that we are more particularly made acquainted with the personal character of Dr. Walker. These chapters will afford considerable amusement as well as instruction to the readers of the volume. We can only glean a few particulars from these chapters.

The attachment of the Doctor to his wife and to his native home are very forcibly and feelingly illustrated by various traits and memoranda which are here brought to light. The simple Quaker appears to have paid little or no attention to his own pecuniary concerns—nor even those of the institution, whose prosperity he had so much at heart. Although he was often requested to vaccinate the children of the affluent, he would seldom



go to them, and rarely received any remuneration for services performed. The only thing in which he was extravagant was PRINTING. "Every thing he wrote must be printed; and if not relating directly to the Institution, he printed the same at his own expense." It need hardly be remarked that his publications were a losing concern, as the following letter to his brother-in-law, Mr. Bowman will testify.

"Dear John,—That I should hardly ever have spoken to thee on my financial affairs, as growing out of the Vaccine Institutions, may have excited thy surprise. While from time to time thou hast helped my poor frugal, striving Annie to meet payments, which the poor managers' advances 'always on account,' did not enable me to do, thou must wonder on things not coming round from year to year, so as to give me something like a proper provision.

"I am sorry to send to thee for liquidation the inclosed demand of 23*l.* 14*s.* 6*d.*, for all my late literary labours. Purchases leave me at this moment without the means of paying so many shillings, I may truly say pence, as the amount of pounds in the bill." 209.

His Quaker maxim of keeping his hat on at table, and in all companies, subjected him to many inconveniences. On board the FOURDROYANT line-of-battle-ship, in the Mediterranean, he was taunted unfeelingly by the officers of the mess, and still more so by the concerted chaplain of the ship, so that he withdrew from the ward-room table, and was nearly starved by so doing!

"The opposition became at last so general, from the intimate connexion subsisting between the officers of a mess, that his own friends were influenced, and requested him to give up his 'singularities.' The lordly priest, the conceited chaplain of the ship, who acted as president at the table, said to Dr. Walker, 'you insult me in the chair.' The captain expressed his wish to interfere. Dr. Walker requested him not to do so, as he would leave the mess, and look out for a passage in another ship. Not having any regular supply of provisions, not being willing to receive from the mess, and not being able to buy any food, he suffered much in the performance of what he considered duty from the pains of hunger, so much so, that 'a hard and old bit of biscuit, a raw chesnut, or any thing falling in my way, that,' he adds, 'I knew would furnish chyle to the system, I have devoured with avidity.' This state continued upwards of a week, and he found that 'the last seven days had given him more room in his clothes than he remembered to have felt since he left England.' Happily there was one Hibernian, a warm-hearted descendant of his ancestor the Duke, who lost his life in crossing the Boyne water, who said he could not allow the Doctor to starve in the ship, and begged him to use his cabin and whatever it contained. His larder, however, was not that of an epicure; a dried tongue, a few anchovies freshened with honey (comb and all) afforded the subject of this memoir, as he himself wittily observes, 'a repast from both the animal and vegetable departments of creation.' At length the valiant transport received the conscientious Quaker, who, having taken a hearty dinner on the day of his departure, found that his stomach, from the delicacy induced by semi-starvation, would not retain its contents, a physiological fact of some practical importance. These events happened in Marmorice Bay." 224.

Dr. Epps conceives that this course of action, on the part of the Doctor, was not the result of "obstinate bravoism, but of conscientious integrity." We agree with the biographer, as far as the individual is concerned. But we cannot help considering this obstinate adherence to a ceremony so general in the world, and so purely void of even subserviency, much more of

guilt, was a very foolish weakness or prejudice on the part of a man who chose to mix with the world. It was a keen and just remark of Plato, who told Diogenes, engaged in ridiculing his dress, that "there was as much pride in the rags of Diogenes as in the dress of Plato." The Doctor was outrageous, because the Duke of York ordered the soldiers to present arms on the passing of the Host, in Catholic countries. There is not much danger of this ceremony being very long in use!

It appears that Dr. Walker was not less sceptical in religion than in physic. He disbelieved in the divinity of Christ—"he did not believe the Holy Scriptures to be divine." He disregarded all revelation, "believing that the light that lighteth every man that cometh into the world is quite sufficient for every moral and spiritual purpose." Such being the Doctor's creed, or rather scepticism, we do not much wonder that the Quakers refused him admittance within their pale:—we wonder, too, what could induce him to seek admittance into their society! The following is Dr. Epps' remark on this important subject.

"And here the writer must state that, in recollecting that the subject of this memoir was a sceptic, and knowing the fact that many good men of thinking minds are in the same unhappy condition, he cannot withhold the fact, of which he is certain, that established systems of church government, necessarily corrupt, and mimicry imitations of these systems by those called Dissenters, more or less impure, are the cause of a great part of the cold infidelity of modern times. Benevolent and thinking beings see nothing of the religion of Christ in men making a trade of religion. In the hierarchy of episcopalianism or the kirk of Scotlandism, they see nothing of the simplicity of Paul and his friends; and in the little popes of dissenting congregations they behold the exhibitions, although on a miniature scale, of a certain individual who lives on the banks of the Tiber." 251.

We shall conclude with one more extract from Dr. Epps, since it conveys a spirited characteristic outline of the moral and physical man whose life has been portrayed.

"In stature, Dr. Walker was about five feet seven inches and a half. His features were long and prominent, especially the nose and the chin. His eyes were large; also his eye-brows. His forehead high; his hair dark brown, which he combed back straight like the patriarchs of old. His bones were large, and were prominently marked from the spare habit of his body. He wore a white beaver broad-brimmed hat; large broad-tail coat, the pockets full of papers, a portfolio under his arm.

He was very moderate in his meals; enjoyed his tea much, and often referred to the love of taking this delightful beverage. For the last fifteen years of his life he never took any malt or spirituous liquors, being convinced, from the rapidity of the recovery of the Mussulmans whom he attended at Alexandria, under their wounds, that the constitution of individuals taking water is in the most healthy condition. He found that he was less liable to take cold from exposure to rain and other commonly considered causes of cold, than when taking malt liquor. He partook of animal, as well as vegetable, food. The day he died, he asked for the former, in the request, 'Annie, bring me some *animal fibre*.'

He often sat up very late at night writing, being a contributor to a great variety of periodicals, which, it is hoped, will repay the debt of gratitude in the most efficient way: for Dr. Walker never was a paid scribe.

Such was this extraordinary man. He knew human nature well. He did not seem to take any notice, but was always noticing. He scorned being influenced by trifles. The laugh of ignorance he did not regard; and the finger of contempt he did not observe. He felt pleasure in his own ways; and no displeasure of others could alter him. 'John Walker could,' as his friend Mr. Cordell said in a speech to his memory at the City of London Tavern, at the Anniversary meeting for 1831, 'never be forced; but could always be led by a silken cord.' There was in him a stream of benevolence that would have fertilized wherever it flowed, had not its course been too rapid and impetuous. He was the apostle of vaccination. He went out, in truth, without scrip or purse. His life was a continual exertion for the happiness of the human race; and, though he felt a little pride in these exertions, let us forget this in the benefits which, from his labours, society now experiences." 292.

Dr. Epps has performed his task well—and sincerely do we hope that the public will aid the author in his benevolent exertions for the helpless and surviving widow, by purchasing extensively the work which we have just closed.



## IV.

### AN ESSAY ON THE INFLUENCE OF TEMPERAMENT IN MODIFYING DYSPEPSIA OR INDIGESTION. By *Thomas Mayo*, M. D. &c. Octavo, pp. 144. London, 1831.

WE have here an addition to the numerous works on Indigestion with which the public has been inundated for the last ten or fifteen years. But it emanates from a respectable source, and is not a mere advertisement to catch practice, and thus gain two objects at once—money and experience—like a well-known surgeon, who announced a work on a particular operation which he had never performed, but which he hoped to have an opportunity of performing, through the instrumentality of said announcement.

Dr. Mayo, like most authors, deems it necessary to offer some reason for presenting his work to the world. The object of the Essay may be gathered from the following introductory passage.

"A patient labouring under indigestion applies to his medical adviser, or perhaps takes up one of the many valuable treatises by which the public has been familiarized with this interesting subject. He receives from his doctor, or he finds in his book, a series of rules, which seem to apply to many symptoms of his case. But he finds himself unrelieved, though he has employed remedies, directed against symptoms which have a real existence in himself, and which, he knows, his similarly disordered friend, Mr. A. or Mr. B., has found greatly beneficial. Or, reading many treatises and consulting many practitioners, he finds each of them assigning to his symptoms a different treatment.

Again, a young medical practitioner applies for instruction to some esteemed work on indigestion. He soon becomes aware, that it contains much valuable matter. But when he begins to practise from it, he finds the application of its rules involve him in numberless errors; and he begins to suspect that the work is valuable *only* as it sets him thinking for himself, or perhaps that it has no value at all. This surmise is greatly strengthened by his observing, that in

many treatises, each evidently relating to the same class of symptoms, very different views of practice are entertained.

It is my object, as far as I can, to explain and to remove the above difficulties.—*Introd.* 2.

"*As far as I can*," was a most wise salvo in the foregoing passage—for, to remove the difficulties above stated, and reconcile the jarring practices of doctors or the theories of writers, is a task far beyond the powers of Dr. Mayo, or any other man.

After some observations, not very new, on the difference between medicine and the exact sciences, our author goes on to observe that, out of the mass of accumulated knowledge there do emerge some few well-ascertained principles which command general assent; while the great mass of materials lie unarranged and comparatively useless, the consequence of which is that many facts, after being ascertained and admitted, fade, and are lost to society. After some gentle censure on the merely practical man and the mere theorist, the author justly observes that, "one great object of every work should be to make the reader think for himself." We recommend the following passage to the perusal of those (and they form the majority of the profession) who despise study, and lean entirely on their own observations.

"The following principles of study are inculcated in the lectures of the late Dr. Armstrong, a practitioner, whose activity of mind fitted him in many respects to advance the science, and whose early death is a just subject of regret. I refer to them as accurately reported in the *Lancet*. After remarking contemptuously on Dr. Cullen, as being, what in the philosophical humility of his mind he was content to be, 'a man who introduced nothing original;' as if indeed to systematize the labours of others could involve no claim to intellectual merit, he states his own notions as to the extent and kind of information which a teacher should give, and which a medical student must be contented to receive. 'I wish you to understand,' says the Doctor, 'that these lectures will be neither elaborate nor learned in quotations, but will simply contain the results of my own observation and experience, laboriously conducted through a period of upwards of twenty years at the bed-side of sick individuals.'*

Now this is just the kind and extent of error which a little vanity, combined with a very dangerous misconception of the value of previously accumulated knowledge, is calculated to produce. It would almost appear, that there was a real advantage in knowledge of twenty years' standing over knowledge combining the results of these twenty years, with the collective experience of ages. But let the lecturer ask himself, how his modicum of practical information would ever have been obtained, but for these previously collected stores, which he affects to contemn, and which would probably assume a much more digested and valuable form, but for the mischievous sarcasms of similar reasoners. I know no other way to obviate this wayward tendency than that of giving just and reasonable views of the value of sound nosology as contrasted with precipitate theorizing. Had the ingenious writer just mentioned been aware how necessary it is for the practical utility of medical views, that they should rest on a broad basis of general principles obtained by comprehensive inquiry, he would, at the risk of being sometimes 'elaborate,' and even of indulging in quotations, have ventured upon a more extensive field than that supplied by his twenty years of personal experience. If Dr. Armstrong *himself* proceeded upon

"* Lancet, vols. v. vi. p. 361."



these principles through the whole of his own practice for those twenty years, what must we think of the perils of his patients during the first ten?" 10.

After some strictures on the danger of drawing descriptions of diseases from single cases, Dr. Mayo says that, "it would not be difficult to show that this oversight has vitiated the entire description of fever given by Dr. Armstrong." We knew Dr. Armstrong better than Dr. Mayo could possibly have done—and we are disposed to think that the late talented lecturer drew pictures of disease from a fertile imagination, or an exuberantly reproductive memory more frequently than from individual cases.

After these introductory observations, the author comes to the subject of the Essay. The first chapter is on the definition of indigestion, and its division relatively to *temperament*. He adopts, with the omission of a single word (primary) Dr. Paris's definition, and informs us that, with no disposition to depreciate the labours of other inquirers, he shall take up the subject of indigestion where they have left it. He thankfully refers to them for its general symptoms, while he endeavours to "show how the disease thus characterized may vary in different classes of men, according to certain combinations of qualities, physical, moral, and intellectual, called TEMPERAMENTS, by which these classes are distinguished." He adopts the ancient divisions, with the addition of the *nervous* temperament, and he then proceeds to consider indigestion in reference to bile, blood, phlegm, and nerve.

## CHAP. II.—DESCRIPTION OF TEMPERAMENTS.

1. *Bilious Temperament.* This expression assumes the "tendency to a copious secretion of bile, in the person of whom it is predicated—and this is compatible with a good state of health. The morbid form of the temperament implies an obstructed, or vitiated, or excessive secretion."

"The bodily conformation of the bilious, is usually represented as rigid and spare, rather than full, or largely developed.

The effect of the bilious temperament upon complexion, is certainly to render it less clear, less brilliant, more sallow, than the same complexion is, whether dark or fair, under the sanguine temperament. In this sense alone we are authorized to describe it as influencing *colour*. The *texture* of the skin seems, on the other hand, very materially influenced by temperament. In the bilious, compared with the sanguine, it is harsh, and often arid. The sanguine temperament, as will be observed, gives a remarkable smoothness and elasticity, as well as brilliancy, to the skin.

'Cependant sans cette maudite bile, on ne gagne pas de grandes battailles,' said Buonaparte, according to M. Ségur, after complaining of its inconvenient effects in deranging his temper. Now, fanciful as this remark, and a great deal more of the same kind, may appear, I am not prepared to assert, that the universal impression as to the bilious predisposition possessing peculiar qualities of a moral and intellectual kind, is unfounded.

Among its most admitted traits, I should enumerate a gloomy but active imagination, a jealous, distrustful, and unsatisfied disposition, and an anxiously reflective cast of thought.

The dissatisfied nature of persons thus predisposed, would account for the stirring, restless, and ambitious course of action with which they are often charged. Such *would be* the prominent features of a life, in which it is supposed, that the *present* and *possessed* enjoyments become, *as such*, comparatively valueless.

One of the most distinctive features in this moral character, is the combination, which it often displays, of extreme and restless anxiety to be engaged in some employment, with a dull lethargic state of intellect, which entirely precludes useful exertion.

We may, indeed, generally observe, that the efforts of the bilious fall short of their aspirations.

But the works of MM. Richerand and Cabanis may be consulted, for a very diffuse and fanciful account of the temperament which I have here endeavoured to sketch. It has been my object to avoid conjectural remarks, and to limit myself to what appears extensively admitted or implied." 24.

## II.—NERVOUS TEMPERAMENT.

Our author acknowledges the difficulty of defining or describing this temperament. The principal characteristics of this, he thinks, may thus be stated.

"First, That it is highly susceptible of impressions. Secondly, That impressions once made are easily re-excited. Thirdly, That when it is in the state of morbid action proper to it, the solids of the body exhibit earlier and more marked phenomena than the fluids." 24.

Dr. Mayo illustrates the nervous temperament in the following manner. A person of vigorous intellect, and of a firm intrepid spirit, may be so organized that the loss of a trifling quantity of blood by venesection, shall produce syncope, even in a high state of health. Yet the same person (and a gallant officer is alluded to) may loose blood copiously by wounds in battle, without any such effect being produced.

"Now, in this case, two points may very fairly be assumed. First, That it is not the quantity of blood taken by the lancet, but some influence produced on the nervous system of the patient, that occasions the loss of power. Secondly, That the part of his nervous system, which first receives this impression, can scarcely be considered as having any reference to his intellectual or moral character. In this case, therefore, we must conclude, that the impression conveyed by the nerves is primarily of a physical kind; or, in other words, that it operates on a part of his system which does not concern him either as a moral or an intellectual agent. Whatever suspension of the powers of mind has ensued, is secondary. This first kind of nervousness I shall, therefore, call physical or bodily." 27.

The Doctor is a subtle casuist; and the above is a fair specimen of refined explanation. For our own parts, we would be tempted to solve the question in a much more concise, though perhaps not so physiological a manner. In battle, a man is in a state of excitement which will bear a loss of blood with little inconvenience, which, in a state of tranquillity, would cause faintness—in the same way that a man labouring under inflammatory fever would bear a depletion that would kill him almost, in a state of health. So, in great pain, opium may be taken to a far greater extent, without stupefaction, &c. than when no pain exists. Surely there need not be such an expenditure of words and ingenuity in stating these obvious facts founded on universal observation. We agree with our able author in the following remarks.

"Totally distinct from this is the susceptibility of nervous affection from moral impressions; a species of nervousness which I shall call moral. It is



remarkably shewn in the bodily symptoms occasioned by timidity. But in each individual it must vary in form, according to the class of emotions, to which he is most predisposed.

Both of the foregoing species may be illustrated by the phenomena of hysteria. This affection may arise out of a series of moral feelings and impressions, influencing the nerves of the uterine system; which, once excited, occasion the various spasmodic symptoms distinguished by that name. Or it may arise from an irritation commencing in the womb, and not propagated from any prior emotion of the mind. In the first case, hysteria has a moral, in the second it has a physical origin. And how different will its treatment be in these two cases, if justly distinguished and appreciated!" 28.

It has been seen already, and will be still more evident in the sequel, that Dr. Mayo deprecates the idea or the practice of drawing general descriptions from individul cases. Yet one of the "three important heads" under which he discusses "nervous susceptibility" is founded on a single case.

"Thirdly, There are persons, in whom some operations of the intellect instantly produce a disturbance in the nervous system, which greatly interferes with the success of these operations. I have heard the sufferer describe this state of his nerves, as occasioning a cloud or mist suddenly to diffuse itself through his mind. In this way, again, nervous defects in articulation may be explained. A gentleman of very distinguished talent, singularly free from the two forms of nervousness above described, is well known by his friends to labour under the third. The occasions on which this defect has been observed in him, are usually those, in which the time for the performance of an intellectual task happens to be limited, the spectators or witnesses numerous, the object important. It is not that he feels more apprehensive of competition, or more anxious about the event, than other men similarly situated, but that his intellectual powers require to be humoured in every way, and are perplexed by circumstances, to which others of a more hardy, though less powerful intellect, would be impassive. Now this state of the understanding is liable, unless the above distinction be appreciated, to be treated as obstinacy, or as stupidity, or as deceit; because it wants those external phenomena of nervousness, which are palpable and conspicuous in the physical, and yet more so in the moral form.

The gentleman whose case I have adduced possesses the utmost steadiness of nerve, both physically and morally. His principles and his bodily constitution are alike sturdy and vigorous. It is only when his intellect has to energize, that the phenomena of nervous irritation are observable, and they are probably heightened by his complete consciousness of the powers which he possesses, and his occasional inability to exert them.

This, therefore, I shall call intellectual nervousness." 29.

## III.—SANGUINE TEMPERAMENT.

This temperament, which is discussed in little more than a page of very open type, is characterized by our author, as more nearly allied, in its ordinary form, to healthy, than to morbid actions. "It implies," says he, "a free and energetic circulation, a well-developed but firm muscular system, and a powerful conformation of the whole person. The complexion is usually florid; but the principal characteristic of the *temperament*, in *this* point, is brilliancy. The moral and intellectual properties of the sanguine are assumed to be such as correspond to a vigorous structure. These are vivacity, energy, and confidence."

## IV.—PHLEGMATIC OR SEROUS TEMPERAMENT.

We shall give this Section in the author's own words, lest it should be thought that we detracted from its merits by abbreviation in our own language.

"The main characteristic of this constitution is a deficiency of energy. It admits of a division into two heads: one embracing those cases in which the want of energy appears connected with a want of excitability; the other comprising those in which it is connected with a want of power. The first of these divisions is well described by the popular term relaxed; the other is the basis of the asthenic or feeble constitution, and, as such, is productive of the long and melancholy class of scrofulous affections. In both of these forms of the serous temperament the natural complexion is most frequently pallid. In both there is a remarkable absence of buoyancy and resiliency of habit. But the skin of the relaxed person, though pallid and bloodless, differs greatly from the unwholesome delicacy of the asthenic, and his muscular system is often even largely developed; while, on the other hand, in the asthenic form, it usually happens, that the bodily structure, if not actually small, is rather fat than muscular. Persons of the relaxed habit are colourless; while the complexion of the asthenic is often of a delicate redness. The pulses of both, except where fever occurs in the asthenic, are languid: but the languor of the relaxed seems connected with sluggishness, that of the asthenic with feebleness. In the relaxed person there may indeed be power; but it is difficult to communicate an impulse which may bring that power into action. In the asthenic, the impulse communicated is felt indeed; but it elicits no reaction, it merely exhausts.

In regard to moral and intellectual characteristics, as well as those which are purely physical, the serous temperament is well distinguished into the above varieties. The habitual sluggishness of simple relaxation, and, on the other hand, the feeble virtues and vices, and the languid conceptions of the asthenic class, are easily recognized. The character of Dr. Johnson was essentially of the first kind, which, it may be remembered, is compatible with *power*. Such were his strong but cumbrous exertions, slowly excited by the stimulus of necessity. Such, indeed, was the lazy application of extreme labour, which produced his dictionary. *He* well describes those painful exertions, under which the nobleman to whom he addressed himself, failed to assist him, until assistance was no longer wanted by him. Without some reference indeed to his languid temperament, it is difficult to account for the indifference with which a man so competent, and so disposed to investigate, could leave questions of extreme philological importance to pass unheeded, or to take their chance in the course of his execution of this extraordinary work.*

For instances of the asthenic class we must not explore the annals of intellectual or moral greatness. In its simple form, this kind of character passes through life unnoticed and unattractive. When complicated with the nervous temperament, it produces a kind of sensitive but powerless enthusiasm, which is in small repute as a quality of *men*,† but is often painfully beautiful in the other sex; painfully, I say, because, in the latter case, we *can* give it our sympathy. For the want of defensive power which it implies, and which we are always

* "On this point Dr. Johnson is repeatedly censured by Horne Tooke.—The above remarks must be understood in reference to those operations of Dr. Johnson, in which even *he* was compelled to labour. The greater part of his works must have been *child's play* to his comprehensive understanding and richly furnished memory.

† "Such is the character of Wilfred in Rokeby."



disposed to treat contemptuously, when observed in man, is no blemish in the character of woman." 35.

The third chapter of the work embraces "a general sketch of indigestion," in which Dr. M. reminds the reader that "originality of matter is not his main object;" he therefore lays claim only to the utility of *applying* the labours of others. This chapter, in fact, is rather a critique on the works of Drs. Paris, Philip, and Johnson, than a delineation of the disease under consideration. It will, perhaps, on that very account, be more attractive to readers in general, who greedily devour opinions as to the merits of writers with whose productions they are familiar. The author shall speak freely for himself, even when we ourselves are somewhat depreciated.

"There is a remarkable diversity in the methods in which medical writers have respectively undertaken the history of indigestion. In the three able writers, whose works justly enjoy the highest present reputation on this subject, Dr. Paris, Dr. Wilson Philip, and Dr. Johnson, I find but little reference to temperament or constitution, as any ground of pathological distinctions. Dr. Wilson Philip furnishes a very masterly description of the disease. He has looked at his subject analytically, and he places his reader in full possession of *his* view of it. But this view is, in fact, just such a one as might be expected to occur to a clear medical eye, after a careful abstraction of those differences which a consideration of temperament would suggest. It will, I trust, appear in another part of this Essay, how necessary it is that such distinctions should be *entertained* and *admitted*, with a view to the complete development of Dr. Philip's subject. It is indeed curious, that he should not have applied such distinctions to indigestion, considering the avowed object of his treatise, 'to give arrangement to the affections termed nervous and bilious, and to ascertain the nature of the disease on which they depend.'

Without establishing any such division of the subject, Dr. Johnson's admirable work furnishes a much larger stock of materials for it, than that of Dr. Philip. The principal difference between the views of these two writers is, that Dr. Philip places before us a definite complaint,—Dr. Johnson describes a morbid habit. The first delineates an attack of dyspepsia, and follows this to its termination; the second draws from the life many characteristic features of a dyspeptic person.

Now it will be expedient to consider the ordinary form of the dyspeptic disease, as given by Philip, and the ordinary features of the dyspeptic patient, as pourtrayed by Dr. Johnson. This will form a useful basis for the more immediate subject of this Essay, the inquiry into those influences, by which temperament modifies the common phenomena of indigestion." 38.

A condensed sketch of Dr. Philip's views are then introduced without a single comment, after which Dr. Johnson comes in for some criticism as well as quotation. Dr. Paris has just right to complain, as not being noticed, either favourably or unfavourably, except as furnishing the best *nosological* character of dyspepsia.

"The indications of debility and irritability of the stomach and bowels, which Dr. Johnson considers the proximate cause of indigestion, are placed before us more loosely indeed, and with less attempt at system, but in a far more graphic way than by Dr. Philip. Dr. Johnson, indeed, enjoys the advantage, on which he frequently insists, of writing from his own feelings: an advantage, I beg leave to say, of a very questionable nature. In analysing disease, the physician has to deal with his own mind upon the same principles which he applies to the judgments formed by his patients and their sympathizing friends. He has *in them* to correct a tendency in constant operation to give unequal relative weight

to the several features of the case, and he is sure to find that tendency active in regard to those points of disease with which their own personal experience may have most familiarized them. Now, the same difficulty besets *him* in keeping his own views steady and clear, when he has been himself a severe sufferer from any given illness, in regard to *that* illness; and his readers should always be on their guard, lest he should deal with his stores of knowledge with no greater discernment than a father may be observed to exhibit in regard to his children, when he has seen a great deal of some, and very little of others.

In common with most other writers on dyspepsia, Dr. Johnson directs his attention and his remarks chiefly to that form of the disease most frequent in the bilious habit. Though this, however, is his leading subject, he comprehends in many of his remarks, and, in his enumeration of the causes of morbid sensibility, a far wider field;* so that his work approaches more nearly than that of Dr. Philip to a view of indigestion classified according to the diversities of temperament.

Though no distinction founded expressly on such a theory is laid down by Dr. Johnson, he supplies some materials for it, so far as nervous indigestion may be contrasted with that of the bilious constitution. There is indeed much valuable practice suggested in relation to the nervous phenomena of the disease. Thus he animadverts on the system of Mr. Abernethy, where it well deserves animadversion, namely, as aiming at the recovery of health through a purgative and mercurial treatment alone. He similarly reprehends the abuse of Dr. Hamilton's purgative system; an abuse which may be entirely referred to the heedlessness of his followers, and not to any doctrines laid down in his invaluable work." 47.

We are inclined to think that Dr. Mayo has misapprehended Dr. Johnson, who, we may venture to assure him, does not claim any *advantage* from the circumstance of having suffered from dyspepsy. Whoever has felt the miseries of that disease, will never recal them to memory without horror—and will never boast of them as advantages. But Dr. Mayo seems to consider that a physician who has laboured under any particular disease, as for example, dyspepsia, is, in a measure, disqualified for writing on or treating the complaint—being in the predicament of a father evincing want of discernment to his own offspring. If Dr. Johnson has had but one patient all his life, and that one himself, there is little doubt but that his descriptions are merely auto-pictorial, and consequently are of no value beyond the individual from whom they are taken. But if, from personal sufferings, a man's attention be strongly directed to a subject, and that man has ample means of studying the said subject in others as well as in himself, we humbly conceive that the personal affliction is no disqualification. Was Dr. Bree's Treatise on Asthma (the best work in the English language on the subject) the worse because that able physician was a sufferer from the complaint?

Dr. Mayo proceeds to copy from Dr. Johnson's work four pages respecting the treatment of dyspepsy, concluding thus:—

"But Dr. Johnson's view of this subject would have been more comprehensive than it is, had it been constructed with a direct reference to a theory of

* "See particularly the valuable Remarks on the Phenomena of Repletion, and on those of Dyspepsia and Indigestion, from p. 18 to 43.



temperaments. Thus, if he had considered the large class in whose constitutions atony and relaxation predominate, and the liability of such persons, in an extreme degree, to the symptoms of dyspepsia, he surely would not have made this complaint identical with 'morbid sensibility of the stomach and bowels.'

In these persons it is morbid *insensibility* that constitutes the main feature of their ordinary indigestion. Such indeed is the usual state of the stomach induced by long continued gluttony; a vice unusual in highly sensitive constitutions. The dyspepsia of the glutton has no necessary connexion with any process of nervous irritation: it has duly ensued upon a long continued course of excessive stimulation, and consists in entire atony and languor." 51.

The foregoing passage convinces us that Dr. Mayo, however closely he may have studied *temperament*, has yet to learn the phenomena of dyspepsia—at least as far as regards the disease in gluttons and drunkards. Let any one of our readers, who has a patient of this description, pay attention for a single day to the symptoms, and if he do not see "*nervous irritation*," and nervous irritability as a prominent feature, we will acknowledge ourselves to be superficial observers. Debility and irritability have been recognized as parent and child, since the earliest records of medicine. Let Dr. Mayo exhibit some food of difficult digestion to one of his patients whose stomachs are atonic and languid from "excessive stimulation," and see the pain and the nervous commotion which will be excited in an organ which he maintains is in a state of "morbid *insensibility*." What would create no sensation in a healthy stomach, will here induce vomiting, or pain, or spasms, or a host of indescribable and horrible feelings in various parts of the body—yet this stomach, forsooth, is in a state of "morbid *insensibility!*"

Dr. Mayo next undertakes the defence of his friend Dr. Philip against the strictures of Dr. Johnson; and with this defence we find not the slightest fault. Valeat quantum valere debet.

In the 4th Chapter Dr. M. takes up the subject of "indigestion of the bilious temperament." This is the form of dyspepsy, Dr. M. observes, which is most commonly described by authors, because there is no other organ, he thinks, so influential in the production of the disease as the liver. The Doctor makes some sensible remarks on the connexion between dyspeptic ailments and mental emotions, but they are not particularly new, nor quite so well expressed as to be intelligible to all readers. This is a defect which pervades the work throughout. There is a very considerable obscurity in the language, though doubtless the ideas were clear enough in the author's own mind. The Doctor takes Dr. Philip's account of the disease and its treatment, making a few scanty remarks in the course of his quotations. Speaking of hypochondriasis, Dr. M. says he cannot agree with those who maintain that "*indigestion is by no means essential* to hypochondriasis." The Doctor then goes into a long disquisition to shew that, although there may be no symptom of indigestion present, yet we are not to rely on such evidence, as the patient is apt to deceive us as well as himself. All we shall say to this is—de non apparentibus et non existentibus eadem est ratio. We have seen many instances of hypochondriasis where there was not the slightest proof of indigestion, and where, on dissection, there was found organic diseases in the head or chest—none below the diaphragm.

"As melancholia* unfolds itself, the difference of treatment which given symptoms require, in relation to the accompanying temperament, becomes more important. The slow pulse, the extreme sense of lassitude, the moist relaxed skin, the entire absence of feverish excitation then observed in the bilious dyspeptic, symptoms which, it is to be observed, they possess in common with the phlegmatic, would incline us to the same active use of tonics and stomachics, as is really suitable to these symptoms, when met with in the latter temperament; and supposing we combine this practice with the occasional use of mild mercurials (a combination highly expedient under serous or phlegmatic indigestion) we shall find the bilious dyspeptic make accelerated progress towards the most dangerous stage of his disorder. For the mild mercurials excite, without giving it a due vent, the secretion of bile;—tonics lock up the enemy who requires to be expelled. The motions will become livid or dark; icteric symptoms will probably supervene; a suffusion will take place over the mind, as dark as the hue given to the face; and the mental affection, which overhangs the confirmed state of bilious dyspepsia, will become decided in character and very difficult of cure.

There is a change of symptoms often observable during the development of melancholia under bilious indigestion, which is very apt to give apparent reason for the use of strengthening and stimulating measures. In the case which I am supposing aperients *seem* rather prejudicial than salutary, from the extreme uneasiness which they produce: 'Omnibus fere melancholicis commune est,' says Lorry, 'ut statim ab alvo depositâ in pejus ruere sibi videantur.' Now the physician has to defend himself against the influence of this *appearance*; it does not, of itself, justify a change to the use of stimulants, though it may compel him to employ less irritating purgatives.

Some very able remarks are to be found in Dr. Johnson's work, in regard to change of scene and place, as it concerns the dyspeptic patient. And these may be applied, without much reserve, to the nervous and to the serous dyspepsia. But in regard to the bilious dyspeptic, when the worst (the mental) class of symptoms are impending, the most extreme caution is required in applying these remarks. Before the disorder has taken this direction, or again, when the melancholic symptoms are on the wane, at either end, as it were, of the disorder, travelling is very beneficial; but not in the intervening state. The serous, or nervous indigestion is better at almost any period for change of place, *as such*; for in these two latter kinds of disorder the stimulus thus applied often works a cure more promptly and effectually than any medical or dietetic expedient. But it is not thus with the *bilious dyspeptic*; 'cælum non animum mutat;' and in the meanwhile he postpones, or half performs those measures by which that part of his cure which depends upon medicine must be effected.

The 'bilious are usually incontinent:' and while travelling they are apt to avail themselves of the immediate benefit derived to their appetite from locomotion, and to take, with apparent impunity, articles of food, which they would otherwise be *unable*, and are still *unfit* to cope with.

The use of exercise is a most important consideration to the bilious temperament. In nervous indigestion it is often greatly overdone. Here it is seldom mischievous, except when applied at an unfit time in relation to meals; a point in determining which the idiosyncrasy of the patient must be consulted." 70.

We confess that we hardly comprehend Dr. Mayo's reasoning respecting the danger of travelling exercise in the *middle* of "bilious dyspepsy," while it is granted that the said exercise is advantageous "at *either end*, as

* "I know no other useful distinction between hypochondriasis and melancholia, than that of degree."



it were, of the disorder." There is no doubt that, in many cases of confirmed hypochondriasis, which is, indeed, but another name for insanity, "no earthly amusement, (as Dr. Johnson has acknowledged,) no change of scene, no mental impressions or excitement, no exercise of the body, can cheer the gloom that spreads itself over every object presented to the eye or the imagination! With them, change of place is only variety of woe!"* But, from some little experience and observation, we can assure Dr. Mayo and our readers in general, that travelling exercise, *judiciously conducted*, is free from danger in the beginning, middle, and end of hypochondriasis, as connected with "bilious dyspepsy." To the following observations, no one can object. They have been strongly urged by ourselves, on many occasions.

"In either case temperance, active exercise, and often a frequent repetition of mild aperients, are expedient, where the bilious temperament is strongly marked. Temperance, indeed, the rising from table with a stomach unoppressed, and a head not heated, is of paramount importance. And if the dark mental symptoms of this temperament are impending, such precautions are doubly requisite. For it is one of the afflicting circumstances of melancholia, that it deprives its victim of the moral energy by which alone he can persevere in measures requisite for his cure. In other diseases it is hard to find the appropriate remedy; in this, it is equally hard to apply the remedy when it has been found. And thus it happens, that we often see the unhappy sufferer unnerved in courage and enfeebled in intellect, revolving in a tedious cycle through a long series of medical advisers, without resolution enough to pay to any one of them consistent obedience.

With regard to the treatment of melancholia, viewed as an advanced stage of bilious indigestion, it must, from the outset of that treatment, be remembered, that the state of the patient has by that time become a very debilitated one.

The bilious temperament is not essentially a feeble one, but he, in whom the mental disease has supervened upon dyspepsia, has *become* asthenic. If his powers of *receiving food* are not greatly impaired, his powers of *obtaining nourishment* certainly are. Food, except when taken in the smallest quantities, generally oppresses him from the moment at which he has taken it, until some rapid aperient has freed him from it; and this state has, in most cases, continued long before the mind obtains attention as a seat of disease.

The risk of depletory measures, as tending to convert this secondary affection into an almost incurable state, the *démence* of the French writers, has accordingly become extreme. The lancet has no place here. The use of mercurials requires perseverance indeed, but caution and moderation. I have seen them, when pushed to salivation, change perversion of intellect into hopeless fatuity. This caution is the more required, in regard to our present subject, because melancholia or hypochondriasis, when a primary disease, and not the sequel or advanced stage of dyspepsia, bears on the whole more active depletion, than that acute and noisy form of insanity which belongs to the nervous temperament." 73.

From the fifth chapter on "Indigestion of the Nervous Temperament," we can only afford space for the following extract.

"A gentleman of a highly nervous temperament, placed in a situation of continued mental exertion, and much responsibility, in a West India island, was

* On Indigestion.

subjected, for some bilious symptoms, which were viewed without any reference to the predominant character of his constitution, to a severe mercurial treatment. He, at the same time, suffered from hemorrhoids, occasioning profuse discharges. His strength broken; his circulation so disturbed that apoplexy at one moment, heart affection at another, seemed closely to impend; his skin constantly arid and giving no relief by perspiration to these last symptoms, he returned to this country. It is not my present purpose to detail the subsequent treatment of this case; I wish to call my reader's attention to the fact, that it was found necessary, in the course of his treatment, to allow a far longer suspension of the action of the bowels than accorded with the general principles of practice, or than was comfortable to his own feelings, rather than expose him to the intense nervous excitement and exhaustion, which was occasioned by the process of fæcal evacuation, even when conducted in the mildest way. The relief, indeed, from feelings of obstruction, which purgatives were calculated to give him, his bowels being always in a confined state, was completely overborne by the attendant aggravation of *all* his other symptoms, such as flatulence, violent palpitation at the heart, with sense of approaching syncope, and vertiginous feelings in the head. All these sensations ensued upon the action of aperients so mild and so carefully chosen, as to imitate strictly the operations of nature, and yet to unload the bowels completely. Time, a patient endurance *on his part* of symptoms of which it was hazardous to attempt the complete relief, and a persevering abstinence *on the part of his physician* from such measures as might relieve present symptoms, and yet increase exhaustion; and, finally, a very cautious use of bark, ultimately restored him to health. The decisive and complete evidence of his recovery was, according to his own remark, the power of perspiring freely.

Now I do not adduce this case as an instance of dyspepsia, but as remarkably illustrating the effect of the nervous temperament in occasioning the ordinary functions of digestion, those indeed which we are usually compelled to excite and encourage in obviating morbid states of the digestive organs, to become, even in their moderate performance, a source of mischief through exhaustion.

This state, though strongly marked in regard to aperients, was not confined to *their* influence. Bark, as I have observed, promoted his recovery; but the difficulty of introducing bark without startling his nervous system, was extreme. I first decidedly succeeded in effecting this by means of inunction." 78.

We are obliged to pass over two chapters on indigestion as connected with the sanguineous and the phlegmatic temperament, as well as many ingenious observations on several other subjects, because our allotted space is already occupied. Dr. Mayo is evidently a well-educated and clever physician, and in drawing attention to TEMPERAMENT as influencing the phenomena and the treatment of diseases, he deserves the thanks of the profession. If we have differed from him on some points, we have only taken the same liberty which he has done, and which he had a right to do—and we hope in the same spirit of liberality and good feeling which characterizes his volume.

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## V.

**THE PHYSIOLOGY OF THE FŒTUS, LIVER, AND SPLEEN.** By *George Calvert Holland*, M.D. Lecturer on Physiology, and Joint Lecturer on the Practice of Physic in the Sheffield Medical Institution, &c. &c. Octavo, pp. 229. London, 1831.

DR. HOLLAND'S quarry has not been low, in aiming at the physiology of the fœtus, liver, and spleen. It would be difficult to select subjects on which more has been said than on these, and on which more evanescent theories have been advanced. The profession look with a certain degree of jealousy on treatises concerning the office of the spleen, and were we booksellers we should hesitate, we should "pause and ponder, and ponder and pause," before we ventured on any *splenetic* speculation. In truth, Dr. Holland's title is not a taking one. A recipe for a new liniment, a specific for a sore leg, would be a much more popular affair than the most recondite discoveries in physiology. The public appear to us to think that physiologists do often play them false, and the multitudes of physiological pretenders of late years has undoubtedly injured the whole fraternity; for when much bad metal is known to be current, honest folks frequently refuse the good. The fact is, that plain persons have been not a little puzzled. One man makes an experiment and deduces from it a certain conclusion; another repeats it and draws precisely the opposite inference. Conflicting statements arise at every turn of the road, till plain practical people get fairly bothered and will listen no more. In former times the error of physiologists appeared to be an excessive disposition to theorize; at the present it seems to consist in an indiscriminate rage for experiments. The following remarks on the subject by Dr. Holland are pertinent.

"In investigating the operations of nature, the inquiring mind is perplexed by studying them through the medium of these ever varying systems, which involve the most important subjects of medical and physiological inquiry in almost impenetrable obscurity. There are scarcely any truths in medicine, like the axioms in geometry, or the first principles in philosophy, so universally allowed, and fully established, that the student of this science can rely on their correctness; it is, therefore, absolutely requisite, amidst so many discrepant theories, clashing opinions, and opposite conclusions, drawn from the same experiments, to put every thing to the test of the most elaborate and tedious examination. Another cause, which has retarded the progress of medical knowledge, is *an almost exclusive attention to experiments.*

However valuable the important discoveries which have been made by a recurrence to experiments, much error has arisen from the false inferences that have been frequently drawn from them,—inferences which, though really the mistakes of erroneous observation, have been regarded as incontrovertibly correct.

It is very allowable to doubt the truth of propositions supported by argument alone, but it seems an act of bold temerity to call in question facts, or obvious deductions from them, said to be proved by direct experiment; and hence, whilst the former are fearlessly controverted, the latter are generally received with too easy an assent." *Introd.* xx.

The first chapter is on the physiology of the liver and spleen. Before propounding his own theory respecting these organs, Dr. Holland endeavours to demolish the theories of his predecessors. With regard to the

liver he disproves, or rather attempts to disprove, the idea that the bile is secreted by the vena portæ. His reasons are these:—that all other secretions are performed by arteries; that in Mr. Abernethy's case there was no vena portæ, and yet bile was formed; and that in all the molluscæ the liver is very large, and is supplied from the aorta only. We conceive that it would not be difficult to answer these objections.

"From what has been previously explained, it is evident that the hepatic artery is regarded as the source of bile; and believing the production of this to be only one function of the liver, it is my intention to account for the great quantity of venous blood transmitted to it and the spleen. Both organs are well adapted to receive a great share of sanguineous fluid, whether we consider the texture as composed of blood-vessels or of cells.

The function of the spleen, as well as that of the liver, independently of the secretion of bile, is considered a *diverticulum* of the system. *If the veins which form the vena porta had passed directly to the vena cava inferior, a thousand accidents, arising either from mental or corporeal disturbance, would have continually placed the life of an individual in imminent danger. Every passion, whether of an exciting or depressing character, and every general and local disease, if severe, whether chronic or acute, would have been liable to have deranged the lungs and heart.* I have already endeavoured to shew, that passions, of a depressing nature, bring the blood in greater quantity than usual from the inferior and superior extremities, and also from the surface of the body to the chest; and I have also stated, that the abdominal viscera participate in the engorgement.* Since the body is continually liable to such changes, baneful effects would follow, unless nature had provided organs, whose situation, function, and organization, enable them to *diminish the burden imposed upon those, whose constant and almost regular action is indispensable for the maintenance of life.* This object is beautifully answered by the liver and spleen. The organs within the chest must be regarded as possessing vital functions. If the lungs were surcharged with blood, or in a condition approaching to it, the properties and distribution of this fluid would be immediately disordered, and with this primary derangement every part of the body would quickly sympathize.

*The liver and the spleen, from being placed close to the thorax, are calculated to relieve the congested lungs and heart, or rather to protect them from sudden and violent commotions;* and are also favourably situated to protect in the same manner the stomach, whose action is scarcely less vital." 20.

Such is Dr. Holland's explanation of the liver and spleen; and after the note of preparation sounded, we must own that we expected something more. The *diverticulum* theory is somewhat older than the Doctor; and the only remark we think it necessary to offer is, that he, in our opinion, attributes to it an undue importance. Our author bears hard on the assumptions of others; yet, if our readers will refer to the present work, they will find, we believe, that his arguments are chiefly assumptions. The second portion of the volume is on the physiology of the fœtus. The following appears to be his theory of the materno-fœtal vascular connexion.

"The venous blood transmitted by the fœtus to the placenta, is absorbed by veins and conveyed to the lungs of the mother; the arterial blood derived from the uterus, is absorbed by the umbilical vein, and flows to the heart of the fœtus. We are not capable of forming an accurate idea of the number or nature of those powers which cause, in either case, the return of blood to the heart. It is quite clear, however, that it flows to the placenta from two opposite points, and

* "See Experimental Enquiry, Chap. xv."



that it is absorbed and carried to the mother and fœtus in a similar way, although not precisely the same, in both instances. The views of BARRY go far towards explaining the circulation of venous blood in viviparous animals after birth, but do not account for its circulation in the fœtus.

It was stated by VIEUSSENS that the red globules of blood were not absorbed by the umbilical vein. The same absurd doctrine was also taught by MONRO, Primus. 'The fœtuses of viviparous animals,' observes the latter, 'have their red blood from the same source that chickens in eggs have theirs, *the action of the heart and the vessels in their body and secundines.*'*

If oxygen, and that organic construction universally belonging to the respiratory organs of animal and vegetable life be wanting, the process of oxygenation cannot possibly proceed. The simple action of muscles, or vessels, on the particles of blood, cannot create an arterial fluid.

I have already alluded to the impossibility of the placenta performing the office of lungs. If a connexion between the placenta and uterus either of a *direct* or *indirect* kind be denied, it is impossible to account for the origin of fœtal blood. The fœtus possesses not the organs necessary to produce it, and, therefore, it must necessarily pass from the uterus to the placenta." 115.

Thus, he considers it impossible for the fœtus to make blood, because it has no organs of digestion to form chyle, the pabulum, nay the very essence of this fluid, no organs of respiration to oxygenate the chyle when formed. The separation of the placenta, without hæmorrhage after the birth of the child, he believes to be effected by the engorgement of the placenta, consequent on the destruction of its connexion with the umbilical vein—the strong contractions of the uterus exerted upon the placenta—the effect of those contractions in diminishing the capacity of the uterine arteries, and thus directly lessening the connexion of the placenta with the uterus, and also preventing the occurrence of hæmorrhage. Such are the views of Dr. Holland, and for the reasoning by which they are supported we refer to the work itself. As we have not leisure for a critical examination of the hypothesis, we will not offer an ex cathedrâ opinion on its merits.

The fœtus has been said or proved to possess a lower temperature than the maternal system; it seldom exceeds 92° or 95° F. The temperature of the fœtus lying dead in the uterus, is said, on the contrary, to be higher. Magendie has attempted to account for this by supposing that the fœtus in utero has some means of lowering its temperature; a very unlikely supposition. We think, *if the fact be a true one*, that the imperfect oxygenation of the blood in the fœtus would account for it. Dr. Holland is of opinion that the distance of the fœtal system from the centre of the circulation, the passage of the blood from the uterine arteries of the mother into the umbilical veins of the fœtus, should be regarded as the causes of the phenomenon. He accounts for the living fœtus being colder than the dead one, by the *cooling* processes of circulation, assimilation, and secretion, going on in the former. 'We were not previously aware that all these were cooling processes, and in truth we look upon the whole of the statements on the subject with suspicion.

The next subject which engages the attention of Dr. Holland is the origin of the liquor amnii and meconium. For one who is ever inveighing against the disposition of the world to receive theories rather than to sift their pro-

* "Edinburgh Medical Essays, Vol. II. p. 301."

per pretensions, we must say that the absence of every thing like positive facts from his chain of reasoning, is surprising. We again refer our readers to the work itself in proof of our assertion. Dr. Holland is far from timid in reasoning on assumptions.

"If we allow that the amnion secretes, the activity of its function will be admitted to be proportionate to its vital energies; but this activity cannot rationally be supposed to equal that of the well-known powers of the skin, which are engaged, in every period of life, in removing from the surface of the body, perspirable matter. The physiologist may very safely infer, that the amnios is secreted by the skin, from the fact, *that such secretion is its natural and unceasing function, and is, moreover, a necessary consequence of its organization, and the distribution of blood to it.* That it is secreted by the amnion, is very improbable. If the fœtus had been placed in a medium of a temperature much lower than its own, *transudation* from the surface of its body would have been almost wholly prevented; but, as the fluid, in which it is immersed, is of the same temperature as itself, such an effect is rather facilitated than impeded.

'Deux causes,' observes EDWARDS, 'influent principalement sur ces deux fonctions: (absorption and transudation) la quantité de liquide contenue dans le corps, et le température de l'eau dans lequel il séjourne. Plus il y a de plénitude, moins il y aura d' absorption; plus la température de l'eau est basse, moins il y aura d' exsudation. Dans la limite extrême de 36° cent. le contraire a lieu; les pertes l'emportent de beaucoup sur les gains, parceque la transsudation prédomine sur l'absorption.'*

The liquor amnii augments with the development of the fœtus. If this fluid is exuded from the skin, its gradual increase is in perfect accordance with those principles which are supposed to explain its origin. *The vital actions of the fœtus, and a more extended surface for secretion, augment in proportion to the progress of gestation.*" 135.

The meconium is referred to the secretions of the abdominal viscera, totally independent of any digestive process. In a chapter on the nutrition and peculiarities of the fœtus, our author comes to the following conclusion.

"I am not, I believe, too sanguine in my anticipations, when I state, that an acquaintance with these truths, will completely subvert the present doctrines of nervous affections; the prevalent ideas respecting the cause of animal temperature; the common notions of the susceptibility of the body to morbid action; and the views generally taken of the origin of acute and chronic diseases, as well as many other corporeal derangements." 148.

It has been a disputed point with physiologists, whether the blood in the umbilical vein differs from that in the umbilical arteries. Dr. Holland thinks he has set the point at rest in the affirmative by an experiment.

"It has already been stated, in the preceding pages, that the umbilical vein carries arterial blood from the placenta to the fœtus. This opinion is supported by Drs. BOSTOCK and JEFFREY. Physiologists in general are either opposed to this conclusion, or consider it doubtful.† It is really astonishing, that a subject so easy to investigate, and to decide by experiment, has been allowed to remain so long undetermined. From the kindness of my friend Mr. CARR, surgeon,

* "De l'Influence des Agens Physiques, p. 352."

† "BICHAT, treating of this subject, observes, 'Les faits précédens suffisent au reste pour établir, comme un fait incontestable, l'uniformité du sang des deux systèmes chez le fœtus."



Sheffield, I have been enabled to prove, by an experiment of the simplest kind, that the umbilical vein circulates arterial blood. The following was the method employed by Dr. JEFFREY:—He took part of the cord, and dissected away the gelatinous substance of it, until he had laid bare the vessels, when, on puncturing them, he observed that there was a difference of colour between the blood in the vein and the arteries. Many physiologists are said to have failed in this experiment. From the tedious preparation which it required I did not succeed to my full satisfaction. But on taking part of the cord, as soon as the child was born, around which I had previously tied a ligature, about two or three inches from the free extremity, and cutting this with a sharp scalpel, in order to make an even surface, I very clearly discerned, on pressing the cord from below upwards, blood of a very different colour, flowing from the umbilical vein and arteries. If the experiment does not fully succeed in the first instance, tie a ligature still farther removed from the end, and, having made a fresh surface, press gently from below upwards. Sometimes a large drop of florid blood is observed to stand directly over the umbilical vein, and another dark coloured over the arteries, without their being in the least mingled with each other, and, in this case, the difference between the two is so striking that no one can fail to observe it. This experiment being so simple, and requiring no previous preparation, any individual of the most ordinary powers, or unscientific character, may easily perform it." 154.

He thinks that the frequency of the heart's action in the fœtus, will tend to render the blood less black for the following reasons.

"The whole mass of the blood of an adult circulates throughout the system once every three minutes, because the heart contracts about 75 times per minute; if it contracted oftener with equal or superior energy, the same quantity of blood would complete its revolution in considerably less time. The heart of the fœtus, instead of contracting 75 times per minute, contracts, at least 120 times. In considering this subject, we must not forget, *that there is the same relation between the heart of the fœtus and the quantity of blood belonging to its body, as there is between that of the adult and the quantity of blood circulating in its system.*

It is therefore obvious, if the fœtal heart contracts 120 times per minute, that the complete circulation of the blood in its system will be effected in almost half the time of that of the adult, and consequently, although venous blood is always mingling with the arterial fluid of the umbilical vein, the blood of the fœtus cannot be particularly deteriorated from this circumstance, because the whole mass is frequently renewed by the very numerous contractions of the heart. If this contracted 75 times instead of 120, the relation between it and the mass of the circulating fluid remaining the same, the arterial qualities of the blood would be diminished almost one-half." 156.

In the eighth chapter Dr. Holland endeavours to prove that the brain, the spinal cord, the stomach, the liver, the pancreas, and the intestines are not essential to fœtal life. In the ninth, he considers the uses of the supra renal capsules, the thymus, and the thyroid glands in the fœtus, and decides that they are *diverticula* to the organs in their proximity. In the tenth chapter Dr. Holland points out the differences in the mode of nourishment between the oviparous, and ovo-viviparous, and viviparous animals. The last chapter is devoted to the influence of the imagination of the mother on the development and constitution of the fœtus. Into all these points our readers will hold us excused for not entering. We have given a sufficient number of extracts to enable the public to form an opinion respecting the manner and merits of Dr. Holland's essay. For our own parts, we un-

hesitatingly assert that it is distinguished by a great superfluity of theory, and an equal deficiency of tangible facts. The author has been free in censuring the world for their disposition to believe on slight grounds, or no grounds at all, and if he has laid himself open to a similar charge, he must not be annoyed or astonished, if the world, through our mouths, retort. Yet, in justice to Dr. Holland, we must say that he evinces, on many occasions, considerable ingenuity, a fair acquaintance with the rules of argument, and we think his criticisms frequently alike just and shrewd. Dr. Holland may complain that we pronounce a dogmatic opinion on the work; that we condemn without shewing fair grounds for our condemnation. To this we reply, that we have done Dr. Holland more justice than ourselves, for our aim and object have been to shew his opinions and say very little respecting our own. The extracts which we have given will in some measure enable our readers to determine, whether our remarks are founded in justice or not.

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## VI.

A PRACTICAL TREATISE ON THE DISEASES OF THE EYE. By *William Mackenzie*, Lecturer on the Eye in the University of Glasgow, and one of the Surgeons to the Glasgow Eye Infirmary. 8vo. pp. 861, London, 1830.

[Second Analytical Article.]

IN a former article we made our readers acquainted with Mr. Mackenzie's sentiments respecting inflammation of the conjunctiva, sclerotica, and cornea. In considering the remainder of the ophthalmiæ, or inflammatory diseases of the eye, many subjects press on our attention. We must view the iris, the choroid, the retina, the capsules of the lens and vitreous humor in a state of inflammation, and then we must look to the traumatic ophthalmiæ, the compound, and the intermittent. A knowledge of these affections is of no mean importance to the general practitioner, as well as to the surgeon and physician, indeed no man, whatever may be his designation or rank in the profession, can practice it with credit, or with justice to the community, unless he be well informed in these matters. In acute inflammation of the more delicate textures of the eye, a blunder from ignorance, or delay from doubt, may make the difference between the continuance of vision or the utter loss of it. We cannot too strongly impress upon the minds of students, the paramount necessity of making themselves masters of this department, at least, of ophthalmic science. Without much practice it is impossible for any man to perform in a satisfactory manner the more delicate operations on this delicate organ, indeed, he is hardly justified in attempting them. But all may instruct themselves in the principles of treatment of those diseases of the eye which all must have an opportunity of witnessing, and the management of which most men will find themselves called on to undertake.



### IRITIS.

The discrimination of this disease has formed a highly important addition to our knowledge. It often exists independent of inflammation in the other textures of the eye, and its insidiousness and danger render it a matter deserving of great attention. There is always a degree of sclerotic inflammation attending it, and the anterior hemisphere of the capsule of the lens is more or less affected, whilst too often the inflammatory action extends to the choroid and retina. The iris, however, is the focus of the disease, which commences on its pupillary margin, and thence spreads to the parts alluded to. The sclerotic inflammation appears to be sympathetic. That the iris only is in many cases affected seems proved by the fact that an artificial pupil often restores vision, when the natural pupil has been closed by inflammation. Before proceeding to treat of the varieties of iritis, we are presented with a section on the affection in general.

"*Symptoms.* There are certain symptoms which characterize inflammation of the iris, from whatever cause it proceeds.

1. Zonular sclerotitis; fine hair-like vessels running in radii towards the edge of the cornea.
2. Discolouration of the iris. If naturally blue, it becomes greenish; if dark-coloured, reddish.
3. Contraction, irregularity and immobility of the pupil.
4. Effusion of coagulable lymph into the pupil and posterior chamber, and occasionally into the anterior.
5. Adhesions of the iris, and especially of its pupillary edge, to the capsule of the lens; in some rare cases, to the cornea.
6. Dimness of sight, and sometimes almost total blindness.
7. Pain in the eye, and nocturnal circumorbital pain.

In every case of iritis, a sufficient number of these symptoms will be met with, to enable the observer to decide on the seat of the disease which is before him. All of them are by no means invariably present. We sometimes find, for instance, a dilated pupil in iritis, probably from the coexistence of amaurosis; and in some otherwise well-marked cases, there is not the slightest circumorbital pain. The disease may also exist in a very marked manner, without any effusion of lymph, or preternatural adhesions of the iris, these being part of the changes which take place only in the second stage of iritis." 423.

*Causes.* These are various. Exposure to atmospheric changes, especially transitions from heat to cold—syphilis and syphiloid diseases—struma, the iritis being usually secondary to corneitis—gout—and local injuries, are the causes which are best ascertained. Iritis has also been described as arising from mercury, and from typhus fever.

*Prognosis.* Iritis may exist in different degrees of severity, and on these the chance of cure must entirely hinge. *In the first degree*—the vascularity in front of the sclerotica is very slight, and existing sometimes only in one or more points, or behind the upper lid, where it might not be discovered—the inner ring of the iris is slightly discoloured—the pupil is of medium-size, but wants its usual clean sharp edge, and may be irregular or misshapen, it is hazy, and its motions are limited and slow—vision is slightly obscure and confused—there is no severe pain and scarcely any intolerance of light. This iritis may exist for many weeks, and yet, by proper treat-

ment be completely overcome. *In the second degree*—the external inflammation is considerable and obvious, the sclerotica presenting round the cornea innumerable ramifications of vessels, forming a complete radiated zone—these vessels seem to terminate abruptly, as if sinking through the sclerotica, and never advance into or over the cornea—the inner, and partially the outer ring of the iris are discoloured from its injection with blood, or perhaps from effusion of lymph into its substance, a change of colour which is apt to be permanent—the anterior surface of the iris appears dull, puckered, and swollen, especially near the pupil, which is retracted towards the lens—the pupil is contracted, irregular, motionless, and filled with coagulable lymph, looking like half-boiled white of egg—vision is greatly impaired—epiphora and intolerance of light considerable—the pain of the eye pretty constant, and attended during the night with circumorbital hemicrania—and there are symptoms of inflammatory fever.

"From such a state of the eye, recovery to a certain extent may take place even without any very methodical treatment. By the use of proper remedies, the inflammation will gradually be subdued, and the effused lymph be absorbed; the contracted pupil will expand, though probably never so completely as to regain its natural size or mobility, and a tolerably fair state of vision will ultimately be recovered. As the symptoms yield, whitish threads of organized lymph will become evident, binding at different points the edge of the pupil to the capsule of the lens. These adhesions are capable of being elongated in time, but never disappear entirely, and necessarily impede the functions of the iris. In other cases, the whole of the edge of the pupil is fringed with lymph, firmly gluing it to the capsule, the centre of which may also be left opaque from lymphatic deposition, in which case the patient sees only through the imperfectly transparent ring left between the central opacity of the capsule, and the fringed edge of the pupil. It sometimes happens in this degree of the disease, that the posterior surface of the annulus minor, which is covered with pigmentum nigrum, having been glued by lymph to the anterior capsule, the proper substance of the iris, as the inflammation subsides, regains, in a considerable measure, its power, and the pupil is enlarged, while the pigmentum nigrum remains adherent to the capsule, and is seen of a black colour fringing the edge of the pupil, and constituting a variety of what has been called *cataracta pigmentosa*." 425.

In the *third* degree of iritis, the surface of the eye is much more intensely inflamed.

"The conjunctiva may be so much so, as completely to mask for a time the zonular redness of the sclerotica. Both the annulus minor and major of the iris lose their natural colour. The anterior surface of the iris is puckered, swoln, and bolstered forward so as to approach the cornea, except its pupillary edge, which is retracted towards the capsule of the lens. Red vessels and spots of blood may sometimes be discovered on the surface of the iris, and still more frequently in the lymph which occupies the contracted pupil. On the surface of the iris, one or more minute elevations of a yellowish colour make their appearance, which in some cases are merely spots of effused lymph, but in others prove small abscesses. Pus, discharged from these, with lymph, and blood, occupy the anterior chamber. The cornea becomes turbid, so as to resemble a piece of glass which has been breathed upon, and in some cases is dotted over with minute brownish spots. Vision is completely, and, in general, permanently lost. Flashes of light in the eye are frequently perceived by the patient, proving that the disorganization is extending to the choroid and retina. There is great intolerance of light, and copious lachrymation. The pain of the eye



which attends this third degree of iritis, is in general constant and excruciating, and attended with severe nocturnal pain in the eyebrow and round the orbit. When the case is attended by severe and unmitigated pain, especially in syphilitic cases, there is reason to dread the most serious changes in the eye, even abscess of the anterior chamber, extenuation of the sclerotica, and protrusion of the choroid immediately behind the cornea, disorganization of the vitreous humour, and ultimately atrophy of the eyeball." 426.

In this degree of iritis the prognosis must always be unfavourable, for under the most prompt and proper treatment, any thing near to a perfect recovery of the eye never takes place. The inflammation will subside, the effused lymph and pus will be taken up from the anterior chamber, but the pupil will never become entirely clear, nor regain almost any degree of motion. Sometimes the iris is so contracted that no vestige of pupil can be discovered, most frequently it remains of the size of a pin-hole, through which a considerable share of vision may be enjoyed, though in most instances this is not the case; and in many, the choroid and retina being diseased, not even an artificial pupil can restore vision.

The distinction of acute and chronic iritis is of great importance. The former takes place in robust individuals, from powerful causes, and more especially if the case has at first been neglected. There are bright external redness, great distention of vessels, rapid and general change of colour in the iris, contraction of the pupil, effusion of lymph, dulness of the cornea, loss of sight, agonizing pain of the eye, severe headache, and considerable fever, restlessness and want of sleep. In a few days vision is irreparably lost. The chronic iritis may arise so imperceptibly, and proceed so slowly that the patient has been known to find accidentally that the vision of the eye is gone. Extension of the inflammation to the rest of the organ occurs more readily in acute cases, yet may equally take place in the chronic. The prognosis must be drawn from the time the disease has lasted, its cause, and its visible effects. In the acute affection irreparable injury may be done in a few days, or, if only ordinarily severe, a fortnight, three weeks, or a month may elapse without serious mischief; in the most chronic form recovery may be expected after a still longer period.

*Sequelæ of the Disease.* The most striking are the changes which the pupil undergoes. The inflammatory symptoms, however severe, begin after a time to abate; if pus and blood have been effused they are gradually absorbed: if an abscess has formed on the iris, the shreds of the cyst at length disappear: and the anterior chamber regains its transparency. In many cases the iris remains permanently expanded, with its motions annihilated. The greater circle may in some measure resume its natural colour, but the lesser does not. The puckered appearance of the iris remains, the pupil is almost closed, and filled by an ash-coloured membrane, the power of vision is entirely lost. This is called *atresia iridis completa*. The condition of the iris is not always so bad. Perhaps there has been no abscess, nor any great quantity of lymph; the iris is left considerably expanded, but still possesses some mobility, and possibly its natural colour may be almost restored. Though the pupil is contracted below its medium size, the coagulable lymph occupying it is reduced to the state of fine pseudo-membrane, mostly opaque in the centre, but somewhat transparent, perhaps

reticulated at the edge. The pupillary margin of the iris does not adhere to it all round, but only at some points, rendering the pupil very irregular, impairing vision but not destroying it, constituting *atresia iridis incompleta*. In a third set of cases only a part of the iris has been inflamed, and a mere thread of opaque matter remains in the otherwise transparent pupil. By this only a single point of the margin of the pupil is kept fixed, and this is termed *atresia iridis partialis*.

*Diagnosis.* The ophthalmiæ with which iritis is apt to be confounded, are rheumatic and catarrho-rheumatic ophthalmiæ, corneitis, aquo-capsulitis, inflammation of the crystalline capsule, and retinitis. Of the three first we have already given a description in a preceding article, and of the three last we shall treat presently; consequently we need not detain our readers with the diagnostic marks of these diseases.

*General Treatment of Iritis.* The chief indications are, to subdue the inflammation; to prevent the effusion of lymph, or promote its absorption; to preserve the pupil entire, or, if contracted, to dilate it; to assuage the pain. Blood-letting must not be neglected; if the patient is robust it must be vigorously employed. General bleeding must be resorted to till the constitutional irritation is abated, and then leeches may be freely applied round the eye every second or third day. Purging, diuretics, the antiphlogistic regimen, and shading both eyes from the light are powerful auxiliaries. Antimony and other nauseants are doubly useful; opiates imperatively demanded by the severe nocturnal pain; mercury a most valuable remedy; turpentine has been recommended lately by Mr. Carmichael; blisters behind the ears are of service after sufficient depletion. Belladonna, in the first degree of iritis, speedily expands the pupil; in the second and third it has no effect till the inflammation has been considerably subdued. It ought to be employed in every case and in all stages of the disease, the extract being smeared on the brow and upper eyelid every evening. Even in neglected cases, where the pupil has become almost obliterated, the continued use of belladonna, for many months, is sometimes attended with gradual dilatation, and improvement in vision. In short, after taking away blood, Mr. Mackenzie would never hesitate to apply belladonna. Such are the general remedies for iritis; its particular varieties require particular modifications of treatment.

### I.—RHEUMATIC IRITIS.

Attending on the rheumatic and catarrho-rheumatic ophthalmiæ, there is in general a certain degree of iritis. But there is a third set of cases, arising, like the preceding, from atmospheric changes, in which the iris is chiefly affected, and the attack sudden, as in other diseases caused by external influences. Not unfrequently both eyes are affected with nearly equal severity; in other cases only one eye is inflamed, or one much more severely than the other.

*Local Symptoms.* At the very commencement of the disease changes occur indicative of the peculiar seat of the inflammation; they uniformly commence on the edge of the pupil, and gradually extend towards the ciliary



circumference of the iris. The pupil is first of all contracted, the motions of the iris impeded, and the pupillary opening deprived of its natural bright black colour. Then the colour of the iris changes; first the lesser circle becomes of a darker hue, and afterwards the greater grows green, if it had formerly been greyish or blue; reddish, if it had been brown or black. This is a never failing index of inflammation of the iris, and is apt to continue after the other symptoms of iritis have been subdued. As soon as it has taken place to a considerable degree in the greater circle, the iris swells and projects towards the cornea, while the pupillary margin is somewhat thickened, and is turned back towards the capsule of the lens. The accompanying redness is not great, and is at first confined to the sclerotica, in which a number of minute red vessels are seen, running in lines towards the cornea. By and bye the redness increases, and partly arises from vessels developed in the conjunctiva; the vascularity is greatest round the cornea, and fades away towards the folds of the conjunctiva. There is pain in the eye, severe and pulsative in many cases, and increased on motion of the organ; pain in the eyebrow; and circum-orbital nocturnal pain.

If the disease is not checked, the pupil loses its circular form, and becomes irregular and greyish. Examined through a magnifying glass its appearance is seen to be produced by a substance very like a cobweb, a delicate flake of coagulable lymph. Into this the dentations of the irregular pupillary margin of the iris seem to shoot, and, at this point, adhesions are afterwards apt to be established between the iris and capsule. Owing to these adhesions the patient complains of being able to see only one side or part of an object.

The effusion of lymph into the pupil continues to increase, and, taking place behind the iris, adhesions are formed between the uvea and capsule of the lens. The quantity of lymph is sometimes so great, as to fall down like curd into the anterior chamber. The morbid sensibility to light, which prevailed in the early stage of the disease, is now diminished; the powers of vision grow more and more limited, and at length little more than perception of light remains. Not unfrequently, the lymph occupying the contracted pupil gives rise to the sensation of a black spot, or fly, or several such spots, placed at some distance before the eye, and partially intercepting the view of objects placed before or to one side of the patient.

As the disease goes on the cornea loses some of its brilliancy, and sometimes striking changes take place on the anterior surface of the iris. Spots of lymph occasionally form upon it; at other times lymph appears deposited in its substance, its fibres getting collected into bundles, and its surface acquiring a peculiar plaited or puckered aspect. In some cases one or more small yellowish-red elevations form on the anterior surface of the iris, commonly about the union of its greater and lesser circles; the elevation gradually increases, is distinctly seen to be a cyst containing pus, bursts, and discharges its contents into the anterior chamber, thus giving rise to spurious hypopium, a small quantity of blood being extravasated into that cavity at the same time. Such is the general history of a neglected case of rheumatic iritis, though many varieties of severity are met with. The inflammation will at last subside, even though no remedies are employed, but then the vision is generally lost.

*Constitutional Symptoms.* This may attack an individual who has never suffered from rheumatism elsewhere. Not unfrequently the subjects have long been subject to other rheumatic affections, though Mr. Mackenzie has never seen this affection arise from any thing but a fresh exposure to cold. During the attack there is pyrexia, frequently constipation, occasionally nausea.

*Causes.* They are the same with those producing rheumatic ophthalmia. Some persons suffer from one or more attacks of this disease every year, till at length vision is destroyed. This iritis frequently occurs during or after the use of mercury.

*Complication with Amaurosis.* This is by no means rare, and is particularly frequent after typhus fever, a disease extremely apt to leave the retina more or less insensible, and the pupil dilated.

"Mr. Wallace has described the complication of amaurosis with iritis after typhus fever, as presenting two distinct stages. During the first stage, there exist amaurotic symptoms alone; in the second, symptoms of inflammation are superadded. The length of time that the amaurotic symptoms continue, before the occurrence of any visible appearance of inflammation, is extremely uncertain, as also the period after fever at which the amaurotic symptoms commence. On many occasions, the amaurotic symptoms, particularly a slight dimness of vision, with muscæ volitantes, have commenced at or even before the time of convalescence from fever, and yet the inflammatory stage has not supervened for weeks or even months; while on other occasions the dimness of vision has not commenced for several days, weeks, or even months, after the febrile attack, and has then been immediately followed by the symptoms of inflammation. Mr. W. never saw a case in which, upon strict inquiry, amaurotic symptoms, more or less strongly marked, had not preceded the inflammatory symptoms. He also observed that the inflammatory symptoms uniformly subsided a longer or shorter time before the amaurotic symptoms disappeared, and often before they had even diminished in severity."* 434.

*Treatment.* Repeated venesection is almost always necessary, followed by the free application of leeches round the eye; the degree of depletion must be regulated by the symptoms. As soon as the mouth is affected by mercury we observe the most marked abatement of the symptoms, but the slightest exposure to cold will induce a relapse with ten fold severity. The patient must confine himself within doors, if the case be severe he must keep his bed; the room should be darkened, there should be a moderate fire in it, if in Winter, a band of flannel should be constantly worn round the head, and several folds of linen over the eye. In pauper patients, out of hospital, it becomes a difficult question whether we can venture on mercury at all. Turpentine may be tried; rest and the antiphlogistic regimen must be strictly enjoined. If calomel is given, it is combined with opium, at bedtime. If we do not give calomel, a powerful opiate should be given every night. Friction of the head with warm laudanum, or with mercurial ointment containing opium, is to be employed, but if these means fail to prevent the nocturnal pain, fomenting the eye-lids and parts around with

* "Medico-Chirurgical Transactions, Vol. xiv. p. 294. London, 1828."



flannel cloths wrung out of poppy decoction is beneficial, the parts being dried immediately after the fomentation, and the linen compress, previously heated, being then replaced. Moderate purgatives and diuretics are of service. Diaphoretics require caution.

Cinchona is undoubtedly useful in certain cases, but, as might well be expected, it is not so in all. It is chiefly serviceable in the combination of amaurosis with iritis after typhus, but still Mr. Mackenzie is of opinion that the treatment of this is best commenced with depletion and mercury. The acute symptoms having been subdued by these means, cinchona or quina are useful, not only in this species, but in ordinary rheumatic iritis. In the combined iritis and amaurosis after typhus, our author suspects some lingering congestion of the head, for in a case which he lately treated immediate relief was afforded by the abstraction of thirty ounces of blood from the arm, after various other remedies had failed. Blisters are more serviceable in rheumatic iritis than in any other. The laudanum with which the head is rubbed for the nocturnal pain may be mixed with an equal quantity of tincture of cantharides. Belladonna should be freely applied morning and evening. The vinum opii is useful in the decline of the disease; any other application is injurious. After all, prevention is better than cure. Let those subject to the disease avoid its exciting causes. Sea-bathing in Summer sometimes prevents relapses, and removal to a southern climate during the Winter may save a patient from his usual attack.

The next section, which treats of SYPHILITIC IRITIS, we shall pass without further notice, having lately dedicated so much space to this ophthalmia in our analysis of Mr. Lawrence's book. We have no such obligation to prevent us from touching on—

### II. PSEUDO-SYPHILITIC IRITIS.

The ecthyma cachecticum of Bateman is apt to be confounded, says Mr. Mackenzie, with true syphilis, and no doubt it occasionally affects the iris in a manner closely resembling syphilitic iritis. Of the ecthyma cachecticum we need not give a description; suffice it to say that, according to Dr. Bateman, it is quite curable by vegetable tonics, and that the administration of mercury is neither necessary to, nor appears to accelerate recovery. Dr. Monteath affirms that, for several years he treated cases of iritis successfully with mercury, believing them to be syphilitic, but that seeing such disease evidently decline, after two or three weeks' continuance without a grain of mercury being taken, he felt satisfied that the cases were not syphilitic. In these cases the small circle of the iris and the border of the pupil are often studded with the small reddish-yellow papulæ or pustules, so characteristic of the venereal iritis. Mr. Mackenzie recommends, notwithstanding, an alterative course of mercury, aided by sarsaparilla, local bleeding, blisters, belladonna, mild diet, &c. Turpentine is worthy of a trial. Among the pseudo-syphilitic varieties of iritis, Mr. Mackenzie includes that which occasionally follows gonorrhœa. Such are the observations on pseudo-syphilitic iritis, and if they amount to little or nothing, they are about as much to the purpose as any other descriptions of what is called pseudo-syphilis.

### III. SCROFULOUS IRITIS.

The iris is rarely the seat of primary scrofulous inflammation, but after scrofulous inflammation of the cornea, it is by no means uncommon as a secondary affection. In a scrofulous subject, however, cold occasionally brings on a mixed ophthalmia, partly phlyctenular, partly iritic, or at least the latter so speedily supervenes to the former, that we may regard it as primary scrofulous iritis. Whenever iritis is observed in a very young person, struma may be suspected as the predisposing cause, the other varieties being rare in childhood. The treatment must consist in the exhibition of calomel and opium, in addition to the remedies required for strumous ophthalmia. The pupil should also be kept under the influence of belladonna. The same plan must be followed in secondary iritis, following strumous corneitis. The difficulty of ascertaining the state of the iris through the inflamed cornea has already been adverted to, and many of the symptoms are equivocal. When the opacity of the cornea is not very great, we may discern at least the size and mobility of the pupil, and if it is contracted, irregular, and motionless, severe iritis has been present. In many cases, by concentrating the light upon the cornea through a double convex lens, we may even observe the discoloration of the iris, and the whitish cobweb of effused lymph occupying the pupil. Neglected cases of this disease are often met with, in which vision has become almost extinct. In such cases there is a remarkable degree of softness or bogginess both of the cornea and sclerotica when pressed by the finger. This is, in Mr. Mackenzie's opinion, a very unfavourable sign, denoting a disorganization of the vitreous humour, always attended by a considerable degree of iritis.

In treating this disease we must attempt, by mercury and belladonna, to counteract the contracted state of the pupil and effusion of lymph from the iris. Mercury must be given with more than ordinary caution and patience, the gums requiring in the first instance to be decidedly affected, after which repeated gentle courses of the medicine will be necessary, the system being supported in the intervals by nourishing diet and tonics. Turpentine has not been tried. We must beware of stimulants to the cornea, so long as any iritis is present, or we may bring on an irreparable degree of irritation.

### IV. ARTHRITIC IRITIS.

Mr. Mackenzie is not quite satisfied of this iritis being of so purely a gouty character as the German ophthalmologists maintain. However, gout not being so common a disease among the poorer classes of this country, and particularly we should imagine of Scotland, as in the wine countries of the Continent, Mr. Mackenzie does not feel justified in pronouncing a confident opinion on the subject. Arthritic iritis originates in two ways. In one case, it is the primary and sole affection of the eye; in the other, a gouty person being affected with some gouty ophthalmia, this degenerates into iritis.

*Symptoms.* The general symptoms of iritis are present in this species,



but so modified as to afford ground for a ready diagnosis. Both the conjunctiva and sclerotica are loaded with enlarged vessels, the redness of a purplish hue, and, what is strongly insisted on as a diagnostic mark, the inflamed vessels stopping abruptly before reaching the edge of the cornea by a narrow ring of a bluish-white colour. This ring sometimes does not occur, particularly at the commencement of the disease, all round the cornea, but only at its temporal and nasal sides. The visible arteries of the eye shew from the very first a strong disposition to be varicose, and at length are so dilated as to form another characteristic symptom. The sclerotica becomes of a dirty greyish-violet colour. The iris and pupil exhibit changes varying in two different habits of body. In those of a meagre irritable habit, the pupil contracts, is filled with effused lymph, and becomes adherent to the capsule, as in the other species of iritis. The only characteristic symptom, besides the white ring round the cornea, is a varicose state of the vessels of the iris, which may be observed ramifying on the surface of that membrane, or forming a vascular wreath within the verge of the contracted pupil. Before the inflammation arrives at this stage there is always general fever. The eye, if left to itself, does not suppurate, but its contents begin to be absorbed, and at last its volume is extremely diminished. In those of a gross habit of body, with little sensibility, the iris, instead of expanding, contracts remarkably, a sign of attending amaurosis, and loses its motion and natural black colour. The pupil is not always uniformly dilated; not unfrequently the iris contracts more towards the temporal and nasal sides of the eye, so that the pupil assumes an oval shape, indeed the iris sometimes becomes so narrow on these sides, as nearly to disappear. There is no effusion of lymph, nor any formation of pus. Behind the enlarged pupil is perceived the greyish green glaucomatous reflection, depending on absorption of the pigmentum nigrum, with dissolution of the vitreous humour, and occasionally accompanied by discolouration of the lens. After a time the lens has lost its transparency, and assumed an opaque sea-green colour, it swells considerably, and projects through the pupil into the anterior chamber. The iris lying on it seems much altered, looking soft, and as if it had undergone a degree of maceration. The varicose state of the vessels of the conjunctiva increases, while those of the choroid, becoming similarly affected, form bluish knots, which shine through the sclerotica. The anterior part of this tunic being extenuated by the pressure of the morbid parts within, a dark ring shines through it, exactly occupying the situation of the corpus ciliare. Vision is now totally gone. The inflammatory symptoms begin to decrease, absorption of the eyeball follows, and in either variety of this disease, if both eyes are not simultaneously attacked, the same process invades the one after the other, till both are destroyed.

"*Pain.* It sometimes happens that before any other signs of arthritic ophthalmia make their appearance, the patient is troubled with peculiar tingling sensations about the eye, and a feeling of creeping over the skin of the face. The eye and the orbit soon become the seat of racking pain, extending to the temple, and shooting down into the jaws. During the progress of the changes of structure above detailed, the attacks of pain are regular and very severe, greatly aggravated in general towards midnight, but in some cases suffering little abatement at any period of the twenty-four hours. The patient is warned

of their approach, by a stinging sensation all round the eye, followed by an increased flow of tears; after which, the pain sets in, and becomes, in many instances, so extremely violent, that the patient is forced to writhe under it, and to utter the most piercing cries of distress.

*Secretion from eyelids.* The epiphora which attends arthritic inflammation of the iris, leads to frequent opening and shutting of the eyelids, by means of which there is forced out from between them, a peculiar white frothy matter, which Beer regarded as diagnostic of arthritic ophthalmia, and which is easily distinguished from any of the ordinary secretions of the conjunctiva or Meibomian follicles. On examining this foam or froth, it appears to consist of extremely minute globules of watery fluid." 453.

*Constitutional Symptoms.* The subjects of arthritic iritis have generally suffered more from the symptoms of irregular than of regular gout. They generally present the marks of the gouty constitution, and are liable to dyspeptic symptoms, headaches, irregular bowels, pains in various parts, eruptions of suppurating tubercles on the face, &c. These patients have generally adopted an erroneous plan of diet, and especially indulged in alcoholic fluids and tobacco. The prognosis is more unfavorable than in any other species of iritis. A first attack may continue for months, and though it then yield, a relapse is always to be dreaded. Besides this, the disease has a strong and most unfortunate tendency to affect the choroid, retina, and humors, so that, though the attack be several times iritic, the rest of the eye-ball becomes at length implicated and destroyed.

*Treatment.* The indications are, to remove the inflammation—subdue the pain—prevent relapses. The inflammation is of an unsound, peculiar, and constitutional nature. General bleeding is seldom advisable, and even cupping and leeches must be cautiously employed. If we venture on general bleeding, the quantity of blood drawn should not exceed ten or twelve ounces, and, if necessary, this may again be abstracted in twelve or twenty-four hours. In most cases leeches to the temples, fore-head, and eyelids are preferable. One or more smart doses of calomel and colocynth, followed by salts and senna, should be given to open the bowels freely; if the tongue continues foul, a common dose of ipecacuan and tartar emetic may be useful, after which, laxatives and some mild diaphoretic. The free use of mercury is improper, but an alterative course, with remedies directed to the digestive organs, is very beneficial. We have no experience of turpentine. Mr. Mackenzie has sometimes derived very striking benefit from the precipitated carbonate of iron, after depletion and mercury had failed. Sulphate of quina might be tried with some hope of success. Counter-irritation by blistering, or the tartar-emetic ointment is of great service. Dry warmth, by means of several folds of old linen, heated at the fire, hung over the eye, and renewed frequently, is the only direct application that can at all times be safely used. Cold applications do harm; hot fomentations are not always harmless, especially if the parts are left wet and exposed afterwards.

Moderation and speedy removal of the fits of pain is of great importance. Beer recommends opium, rubbed to the consistence of a liniment, to be rubbed in round the orbit; but mercurial ointment with opium and extract of belladonna, or volatile liniment with laudanum, may be applied when the evening paroxysm is expected to recur, and repeated, if necessary during the night or day. Opium internally should be avoided unless the pains become very urgent, but much relief may be obtained by the other and milder narcotics. Our author has found a vinous solution of the murias hydrargyri with belladonna, a convenient form for exhibiting the latter medicine as a sedative, and the former as an alterative in this disease. The apparent causes of the occasions of pain, as, agitation, changes of temperature, &c. must be avoided.



Relapses are to be warded off, partly by constitutional, partly by local means. The former are in part medicinal, chiefly dietetical. A temperate diet, gentle aperients, promotion of the action of the kidneys by magnesia and soda water, or some mild aperient and diuretic mineral water, will be highly beneficial. Daily tepid sponging of the body followed by dry friction, pure country air, regular, continued and varied exercise, and the avoiding of sudden changes of temperature are all important. If the patient has long been accustomed to wine he may be allowed a small quantity of spirits and water.

"After an attack of gouty inflammation in the foot, we see the parts continue long tumid, weak, and morbidly sensible, while the most trifling accident, internal or external, is apt to produce a relapse. The same is observed in regard to the eye, only that in this organ we have the advantage of directly witnessing the exceedingly relaxed, varicose, and livid state of the blood-vessels, an indication of how much is wanting to restore the affected parts to their natural tone. Even after an acute attack of arthritic iritis is subdued, some counter-irritating means ought to be continued, such as a seton in the neck, and recourse should be had to the use of local applications of a tonic kind. As a means of this sort, the Germans are in the way of using small bags of dried aromatic herbs, suspended over the eye. The bags are made of old linen, and are quilted, so as to keep the herbs equally spread out. The aroma, constantly emanating from the herbs, imparts a permanent, pleasant, and useful stimulus to the debilitated blood-vessels and nerves. The best herbs for this purpose, are bruised chamomile flowers, sage, rosemary, marjoram, and the like, with or without the addition of a little powdered camphor. If the exhaled aroma reproduces redness of the eye or aversion to light, this will indicate that the proper time for the use of local stimuli has not yet arrived, and that they must be postponed. Friction round the orbit once or twice daily with alcohol, tinctura aromatica ammoniata, or the like, is another local preventive measure which is found of use. Even stimulants to the eye, as vinum opii and red precipitate salve, beginning these preparations in a dilute state, and gradually augmenting their strength, are found to abate the morbid sensibility of the eye, and thus render it less apt to suffer from the ordinary external as well as internal causes which produce inflammation. It must not be forgotten, however, that remedies of this kind, if used before the inflammation is completely subdued, will, as in every other species of iritis, produce the very worst effects." 457.

## V.—CHOROIDITIS.

The choroid coat being completely hid from view and exercising only a subsidiary function, inflammation of it has scarcely attracted attention. In an early stage this is one of the least striking of the ophthalmiæ, and the disorganization which it produces when advanced, has either escaped notice, or not been referred to its true and legitimate cause.

"I have already had occasion to mention, that iritis is occasionally attended by inflammation of the choroid. Were we to adopt the common notion, that the iris is a continuation of that membrane, we might be led to conclude, that choroiditis and iritis should always go together. Perhaps, in some degree, this

may still be the case. At the same time, from the arteries which nourish these two parts being quite distinct in their course and distribution, the idea of a separate iritis, and a separate choroiditis, is *a priori* rendered probable.

"For some time, the separate existence of choroiditis was with me rather a matter of speculation, and a conclusion from analogy, than a fact ascertained by observation. I am now convinced, however, that the choroid is sometimes the seat, almost quite independently, of inflammation; that in certain cases of ophthalmia, it is the focus of the disease, and that the neighbouring parts may be as little affected when that is the case, as the sclerotica is in iritis, or the iris in sclerotitis. That it is of importance to distinguish the disease which I am now about to describe, will appear very evident, when we consider its dangerous nature. Its symptoms, as we shall immediately see, are very different from those of any other ophthalmia; and although ultimately the whole eye may be involved by inflammation commencing in the choroid, yet choroiditis, in the early stage, exists without any signs of disease in the iris, and without any other effects upon the sclerotica and retina, than those which must necessarily arise from the pressure of an inflamed and swoln membrane, placed in contiguity with other membranes, more or less susceptible of suffering from that pressure. I consider choroiditis, therefore, as completely a primary and distinct disease." 458.

*Symptoms.* From the pressure outwards of the inflamed and tumefied choroid, the exterior tunics of the eye become attenuated, so that the choroid shews its dark colour through the sclerotica, which therefore appears blue or purplish. This is a remarkable, and often an early symptom. The degree of discolouration varies with the severity and duration of the attack. After a time the affected part protrudes, commonly on one side only, near the cornea, as if the corpus ciliare was the seat of the disease, and more frequently above or to the temporal side of the cornea than below or to its nasal side. The tumour may enlarge to the size of half a filbert, or more, when it is generally of deep blue colour, with varicose vessels running over it, and has been called *sclerotic staphyloma*. Several such tumors may surround the cornea. The front of the eye is not the only seat of this sclerotic, or rather choroid staphyloma. Scarpa twice met with staphyloma of the posterior hemisphere of the sclerotica in the dead body. In one case, that of a woman forty years of age, who had lost the vision of the affected eye some years before, in consequence of an obstinate painful ophthalmia, the vitreous humor was found converted into limpid water, the chrystalline somewhat yellowish, but not opaque; there was a deficiency of the nervous expansion of the retina within the cavity of the staphyloma; the choroid was very thin at this part, deprived of its natural colour, and its usual vascular net-work; and the sclerotica, particularly at the apex of the staphyloma, was so thin as scarcely to equal the thickness of writing paper.

There is no doubt that the vessels of the choroid are greatly enlarged; our author saw, in the hands of Professor Beer, a preparation in which the varices of an inflamed choroid were as large as small peas. But frequently the distention of the choroid and sclerotica is connected with an effusion of watery fluid between the choroid and retina. This Mr. Mackenzie has frequently had occasion to evacuate with a needle. If this is not done it accumulates and presses the retina before it, produces an absorption of the vitreous humour, and gathers the retina into a cord, which, stretching from the entrance of the optic nerve to behind the lens, is seen through the pupil, looking like a deep-seated cataract, or the advancing tumour of fungus



hæmatodes. The visible arteries of the sclerotica are much enlarged, and ramify over the distended portion. Not unfrequently there is a patch of redness near the cornea, fed by one or more of these arteries greatly dilated. Sometimes the redness is confined to the upper part of the eyeball; there is scarcely ever any general redness.

The iris is not affected, but the pupil in almost every case undergoes a remarkable change of place. The iris is always narrowed towards the affected portion of the choroid, often the pupil is almost directly behind the edge of the cornea; it is most frequently displaced upwards, and upwards and outwards. Occasionally it continues small and immoveable, in other cases it is immoveable, but not dilated; in very severe cases it is greatly enlarged, the iris having nearly disappeared at that part of its circumference towards which the displacement of the pupil has happened. The pupil does not return to its place, even though the choroiditis is subdued. Opacity of the cornea, generally the edge nearest to the portion of affected choroid, is a frequent attendant on choroiditis. In other cases there are pretty extensive, but very irregular spots of whiteness. In some severe and old cases the cornea becomes almost altogether opaque, and, partaking in the staphylomatous degeneration of the neighbouring sclerotica, even undergoes a degeee of dilatation. From this affection of the cornea alone vision may be almost or altogether lost.

In consequence of choroiditis the eye may enlarge, and even protrude considerably from the orbit, when it is liable to suffer from external inflammation. If this inflammation runs high the conjunctiva becomes chemosed, puriform fluid is deposited behind the cornea or between its lamellæ, the eye bursts, continues to swell and protrude, assumes a fungous appearance, bleeds profusely, and produces such pain and deformity as to require extirpation.

Intolerance of light and epiphora are generally considerable. The pain varies much in different individuals. When the sclerotica is much distended, especially when suddenly so, there is much increase of redness, and severe, sometimes furious pain. Hemicrania is present, not strictly circumorbital or nocturnal. Vision is variously affected. Dimness of sight is sometimes the first symptom, or hemiopia, all objects to one or other side of a perpendicular line, or above or below a horizontal line appearing dim, or all objects appearing confusedly and as if double, even when viewed with one eye. Total blindness may ensue when the choroid seems only partially affected, or a good share of vision may be retained when the whole choroid is evidently affected.

*Constitutional Symptoms.* The subjects of the disease are adults only, and chiefly those of strumous constitution. In the early stage of the disease, before distention brings on acute pain, the pulse is not affected; after the patient has suffered much, a cachectic state is apt to follow, with quick pulse, pale or sallow complexion, great irritability, and general weakness. The digestive organs are frequently much deranged, even from the very first.

*Remote and exciting Causes.* Want of exercise and of the open air—derangement of the stomach and bowels—over-use of the eyes in reading,

sewing, &c.—exposure to too much heat and light, especially to the glare of hot fires, and to sudden changes from heat to cold—blows upon the eye.

*Prognosis.* Recovery is always slow, and if the disease has gone to any considerable length, it is scarcely ever complete, the vestiges being generally permanent, although the progress has been fairly checked. In many cases we are lucky if we arrest the disease, yet sometimes the cure proceeds to a degree beyond our expectation. Mr. Mackenzie gives a case in illustration of what we can sometimes effect.

*Treatment.* Profuse and repeated blood-letting is of the utmost importance in the early stage of choroiditis. A person not acquainted with the nature of the disease might be tempted, from the little appearance of inflammation, to apply merely a few leeches, when he should be opening the temporal artery, and removing a large quantity of blood. Mr. Mackenzie has known the blueness and distention of the sclerotica, which had continued unabated by leeches and other remedies, for many weeks, disappear suddenly and completely after the loss of twenty or thirty ounces of blood from the temple. Bleeding from the jugular vein, or from the arm is highly useful; and so is the application, every second day, of twenty-four or more leeches round the eye. In chronic cases we must not neglect the free and frequent use of leeches. Purgatives are of great service—calomel, as a cholagogue, followed by salts and senna should be repeated frequently during the treatment. We might naturally expect that mercury would be beneficial here, as in iritis, but Mr. Mackenzie, who has used it in all forms and doses, has not hitherto found much advantage from its employment. He still prescribes it because he has seen too few cases to enable him to pronounce definitively on its value, and because it does good in all other chronic inflammations of the eye. Turpentine has been lately tried by our author, but he has come to no conclusion respecting its efficacy. In one case, in which Mr. Mackenzie had made up his mind to extirpate the eye, it shrunk considerably under the use of iodine, while the sclerotica assumed much more of its natural whiteness. After due depletion, Mr. M. has seen great good from the precipitated carbonate of iron and sulphate of quina. Counter-irritation, best obtained by a tartar-emetic eruption between the shoulders, is very useful. Puncturing the sclerotica and choroid, so as to evacuate the aqueous fluid collected between the latter tunic and the retina, is of much importance in the chronic stage of the disease, for Mr. Mackenzie has not ventured to try it in the acute. The operation is performed by thrusting a broad cataract-needle to the depth of an eighth of an inch, not in the direction of the lens, but towards the centre of the vitreous humor. The operation gives great relief, and may be repeated every eight days, or at longer intervals, according to the state of the eye.

## VI. RETINITIS.

"It is easy to understand that the internal inflammations of the eye may arise sometimes in one texture, and at other times in another; that in one case the bloodvessels of the retina shall be first affected, in another, those of the choroid, in a third, those of the iris. The point of origination will depend on the natural constitution of the organ, and the manner of action of the exciting cause. Even



from birth, the eye varies much in different individuals, one or other texture appearing to be congenitally weaker or stronger than the others, so that the same exciting cause, operating on a number of persons, shall produce in one, inflammation of the conjunctiva; in another, sclerotitis; in a third, iritis; in a fourth, inflammation of the retina. On the other hand, the nature of the cause leads in one case to external, in another, to internal ophthalmia. Cold, operating on the eye, will bring on inflammation of the conjunctiva or sclerotica, while the sudden and direct reflection of a strong light into the eye will be apt to produce an inflammation of which the retina is likely to be the focus. The inflammatory action, however, is seldom, if ever confined to the part first affected. We have already seen how inflammation, originating in the iris, spreads to the sclerotica, and to the choroid; and how choroiditis affects the textures both within and without the choroid. In the same way, inflammation commencing in the retina is likely to spread inwards to the vitreous humour, to the capsule of the lens, and to the lens itself, all which parts are fed by branches from the central artery of the retina; and outwards, to the choroid and iris, to the sclerotica and cornea, and to the conjunctiva. Thus an inflammation of the whole eyeball may arise from a very limited point of origin.

Nor is this a fanciful picture of disease. Although a retinitis, ending in general ophthalmitis, and arising from causes of very limited and transient action, is rare; yet it occasionally occurs, especially after long continued straining of the sight in the examination of very small, perhaps microscopical objects, under a strong light, reflected into the eye, either immediately from the object of examination, or from a speculum.

In such cases, however, there are commonly certain predisposing causes, which ought not to escape observation; such as plethora in and near the organ of vision.

Unexpected and vivid flashes of lightning sometimes excite inflammation of the retina, and this disease has frequently been excited by imprudently viewing an eclipse of the sun. Prisoners, who have been long confined to the darkness of a dungeon, have been seized with inflammation of the retina on being brought suddenly forth into the full glare of day. Travelling over a long tract of country covered with snow, has been known to produce the same effect. Saint-Yves notices the case of a man who became blind in consequence of going too close to the light and heat of a strong fire, in attempting to tie a string to a fowl, turning on the spit; and another, of a workman in the mint, who lost his sight from the brilliant flashing to which he was exposed, while pouring metal into a red-hot crucible. Both of these accidents were probably owing to retinitis.

The Esquimaux, who inhabit Hudson's Bay, are well aware of the loss of vision which arises from exposing the eyes to the constant view of a country covered with snow. They make use of a kind of preservers, which they term snow-eyes. These consist of two pieces of wood or ivory, so formed as to fit the eyes, which they completely cover, and are fastened behind the head. Each piece presents a narrow slit, through which every thing is distinctly seen. This invention preserves them from the snow-blindness, which is apt to be occasioned by the strong reflection of the sun's rays; and which, it is probable, is the effect of inflammation excited in the retina.*

* "These instruments also increase the powers of vision, so that the Esquimaux are so accustomed to their use, that when they are desirous of viewing any thing at a distance, they mechanically apply them to their eyes. Different accounts are given of the slit or slits in these instruments, for some tell us there is only one in each eye-piece, and that it is long and narrow, while others say that there are two, about a quarter of an inch long. This is probably regulated by the fancy of the wearer."

Blinding persons by producing retinitis was, and still is, in some countries, a mode of punishment. The person is compelled to look steadily on a concave mirror of polished steel, held opposite to the sun. This would excite speedy inflammation of the retina, and certainly end in a greater or less degree of insensibility to light. Some such method must be employed in India at this day, as many of the native princes, who have been condemned to the loss of sight by the jealousy of their rivals, but are suffered to live in a state of captivity, are said to have no appearance, at a little distance, of being blind." 467.

Chronic cases of retinitis are not unfrequent, under the designation of weakness of sight; there are morbid sensibility to light and slight obscurity of vision, followed by gradual contraction of the pupil, immobility of the iris, and amaurosis. Watchmakers, jewellers, and those who spend much time in reading and writing are liable to be affected. Stimulant and tonic treatment is injurious; leeches round the eye beneficial. In strumous ophthalmia, it is conjunctivitis and not retinitis which causes the excessive intolerance of light.

*Symptoms of Acute Retinitis.* The patient first complains of a general feeling of pressure and tension of the whole eyeball, succeeded by obtuse, deep-seated, pulsative pain, which seems to increase every moment, and soon extends to the eyebrow and cranium. The power of vision is already sensibly diminished, and every hour becomes more and more feeble, the pupil has lost its glancing blackness, and has become much contracted. At last it completely closes, the iris having reached its greatest possible degree of expansion. Long before the pupil is closed, the sensibility of the retina seems extinct, and yet when the pupil *has* closed, the patient experiences a troublesome sensation of fiery spectra, with every oscillation of the internal blood-vessels of the eye. During these changes the iris becomes discoloured, greenish or reddish according to its original hue. The anterior chamber is strikingly diminished in size by the advance of the iris towards the cornea, during which the whole sclerotica is rose red. Some time after this the conjunctiva presents a pretty thick net-work of blood-vessels, and the cornea loses much of its natural lustre, without becoming absolutely opaque. Now there is severe inflammation, fever, with almost maddening headache. Sometimes, during this period of the disease, the pupil does not completely close, but it is cloudy, and on looking at it through a magnifying glass, is seen to be reddish-grey, while the power of vision is totally lost. So severe are the fever and headache that retinitis is often mistaken for phrenitis. The pain of the eye now becomes unequal, and though still pulsative is attended with a feeling of cold and weight in the part. Shiverings take place, and suddenly there appears a quantity of pus gravitating to the bottom of the anterior chamber. It may accumulate to such a degree, especially in neglected cases, that the cornea projects and at last gives way under insufferable pain; the eye then collapses, and the pain gradually subsides. If the pupil has not quite closed by the end of the first stage, we see, just where the hypopium begins, fine whitish filaments of lymph, shooting from the edge of the cornea towards its centre. Viewed through a good lens these have the appearance of a delicate cobweb. After the pus has covered the pupil and remained, perhaps, long unabsorbed, this pseudo-membrane becomes whitish-yellow, from little particles of the pus lodging in the interstices, and



sometimes a single piece of what seems to be thickened purulent matter, attached to this membrane, projects through the pupil, intimately connected with the pupillary edge of the iris. If the pupil has closed completely in the first stage this spurious cataract cannot, of course, be observed.

*Prognosis.* If proper treatment be commenced before the pupil is much contracted, the prognosis is not unfavourable; but if vision seems already extinguished, it is extremely unfavourable. If the pupil is once closed, even before the retina appears to have become insensible, there is no longer any hope of preserving sight; for even should the pupil re-open in some degree, yet it remains small and motionless, and the eye is still blind. If retinitis is neglected or mistreated in the commencement, it proceeds rapidly to a dangerous inflammation of the whole eyeball. In the second stage the prognosis is always bad, for before the disease has advanced so far, vision is irretrievably lost. All that can be done is to endeavour to save the form of the eye, by limiting the suppuration as much as possible. If the disease has gone on to a complete ophthalmitis, attended with chemosis, we may not even be able to do this.

" *Treatment.* Complete rest of the eyes and of the whole body, darkness, abstinence, and active depletion, followed by the rapid introduction of mercury into the system, are the means to be depended upon in the first stage of retinitis. Copious blood-letting from the arm is to be immediately followed by a plentiful application of leeches round the eye. Should the pain of the eye and head still continue, the jugular vein or temporal artery ought to be opened, and a considerable quantity of blood abstracted.

Calomel with opium ought to be given in frequent doses, till the mouth is affected.

Belladonna is to be applied in the usual way.

In the second stage, the preservation of sight is out of the question. A warm emollient poultice is to be laid over the eyelids. If only a small quantity of matter be present in the anterior chamber, we must on no account let ourselves be induced by that to open the cornea, for the purpose of evacuating it; but trust to the sorbefacient effect of the mercury, assisted by blisters behind the ears or on the back of the neck. Beer recommends the eye in that state to be touched repeatedly in the course of the day with vinum opii, by the careful use of which, in combination with the internal employment of opium and sometimes of cinchona, he had seen collections of pus in the anterior chamber completely disappear. Should the hypopium increase, so that the anterior chamber is filled, we cannot trust to its absorption, but must give exit to the matter by opening the cornea with the extraction knife. In such circumstances, the natural appearance of the cornea and iris is completely lost, the eyeball sometimes remaining flattened in the situation of the cornea, while in other cases it becomes staphylomatous." 470.

## VII. AQUO-CAPSULITIS.

By this term is meant inflammation of the cartilaginous membrane lining the internal surface of the cornea. When inflamed it becomes more or less opaque, there is a muddiness in the anterior chamber, and occasionally an appearance as if the eye were unusually full and prominent, arising from an increase in the quantity of the aqueous humour. In more severe cases coagulable lymph is effused, and if the iris be inflamed at the same time,

this effusion may unite it with the cornea. Besides the diffused muddiness there are often present one or more milk-white spots on the internal surface of the cornea, giving it a mottled appearance, and forming the most characteristic mark. Mr. Wardrop has accurately described their more opaque central points as surrounded by a kind of disk, resembling what is called the eye of a pebble. In one of two cases in which Mr. Mackenzie distinctly observed this appearance, the spots appeared and disappeared at different points of the internal surface of the cornea even in the space of a few hours, so that the patient saw worse in the morning, when most of the spots were observed, and better towards evening, when those at the upper part of the cornea had greatly diminished. As in iritis, there is a circular zone of minute vessels seen on the anterior part of the sclerotica; sometimes one or more distinct blood-vessels are seen traversing the inflamed membrane; some vessels of the conjunctiva also are frequently enlarged, appearing as insulated trunks. The vessels on the white of the eye are of bright red colour, and gradually assume a more crimson hue, as the symptoms subside. Sometimes there is epiphora, but generally the patient suffers very little from exposure to light. Vision is more or less dim, and there is a particular sensation of fulness and distention of the eyeball, with dull aching pain, generally in the forehead, occasionally also in the back of head; symptoms, which Mr. Wardrop avers to be instantly and permanently relieved by evacuating the aqueous humour.

The constitutional symptoms vary much in their degree of severity. Sometimes there is considerable pyrexia; in other cases, the disease assumes from the first a chronic form, and, after a certain period, participates in any peculiarity of the patient's constitution, and becomes thereby modified. During the inflammatory symptoms there is usually so much muddiness of the anterior chamber, that no distinct portions of lymph, unless of large size, can be distinguished. When the turbidness goes off, flakes of lymph may sometimes be perceived; at others, the whole surface of the inflamed membrane is covered by a thin layer of it. Sometimes the lymph floats like a thick cloud in the anterior chamber; in other cases it is deposited in streaks, of a reticulated appearance; in others, it resembles a purulent fluid. If the lymph is not afterwards absorbed it may become organized, and not unfrequently red vessels can be seen ramifying through it. This is more frequent than a red vessel or vessels running along the internal surface of the cornea without any effusion of lymph.

"*Treatment.* Little else is known regarding the effects of remedies in this rare ophthalmia, than what is mentioned by Mr. Wardrop, in his paper on Evacuation of the Aqueous Humour, in the fourth volume of the Medico-Chirurgical Transactions. In the cases there recorded, benefit appears to have been derived from cupping the temples, purging, fomenting, and the application of such stimulants as murias and nitras hydrargyri in solution, red precipitate salve, and sulphuric ether. Mr. Wardrop, however, places most reliance on the evacuation of the aqueous humour, stating that there is no inflammation of the eye, where so much benefit is derived from that operation, as when the disease affects the internal layer of the cornea. He had never found it fail in procuring immediate relief of the pain of the head, and instantaneous restoration of the transparency of the anterior chamber.

The opening through the cornea, by which the aqueous humour is to be discharged, may be made with any of the knives commonly used for extracting the



cataract, or with a broad iris-knife. It is sufficient that the point of the instrument be introduced so that it makes a puncture into the anterior chamber; this should be done near the junction of the cornea and sclerotica, at any part of the circumference. When the knife has penetrated into the anterior chamber, it may be withdrawn a little, and the blade turned on its axis, when the aqueous humour will readily escape. It is better not to remove the instrument altogether, till the fluid is observed to be discharged; for if the incision be not sufficiently large, and the knife taken away before the aqueous humour flows out, the elasticity of the cornea closes the wound, and either hinders the evacuation from being so sudden, and consequently so efficacious, or the closure of the wound entirely prevents its escape. The operation, therefore, which is necessary to discharge the aqueous humour, is merely the first step of the section of the cornea, made in extracting the cataract, or what is called the *punctuation*.

The chief difficulty in performing the operation, arises from the pain occasioned by the necessary pressure on the eyeball, whilst keeping open the eyelids; but until a sufficient portion of the cornea is brought into view, and the movements of the eye completely under the management of the operator, the introduction of the knife should not be attempted. The upper lid should be elevated by the fingers of the assistant, or by Pellier's speculum; while the operator, with the fore and middle fingers of the hand which does not hold the knife presses down the lower lid, and applies their points over its edge, in such a manner that they touch the eyeball, and can apply any degree of pressure upon it which may be necessary. After the assistant raises the upper lid, the patient should be directed to look downwards; and then the assistant employs a sufficient pressure, to keep the eye in that position.

The operator now makes the puncture; but as the patient is very apt to start when he first finds the instrument coming in contact with his eye, it is useful merely to touch the cornea repeatedly with the back of the knife till all risk of starting is over; and as soon as its extremity rests on the part where the puncture is to be made, the knife may readily be raised on its point, and thrust into the anterior chamber."*

It is probable that a variety of other remedies besides those mentioned by Mr. Wardrop might be useful in aquo-capsulitis; especially cinchona, turpentine, and mercury. Of these, however, nothing can be said from experience." 473.

### VIII. INFLAMMATION OF THE CRYSTALLINE LENS AND CAPSULE.

Common lenticular cataract appears to be a consequence of the impeded nutrition of advanced life, whilst opacities of the capsule are probably always the result of inflammation. Capsular and capsulo-lenticular cataracts are rarely seen till the inflammation has subsided, but Mr. M. confirms the accuracy of Professor Walther's description.

Inflammation of the capsule generally occurs about the middle of life, and in slightly cachectic subjects, but our author has more than once seen it in young children. It occurs oftener in light eyes than dark, and the iris becomes a little darker, the pupil somewhat oval or irregular. The motions of the iris are at first free, but subsequently sluggish and very limited. The pupil is smaller than natural, and there is usually a black rim of irregular breadth round its edge, arising from the pigmentum nigrum of the posterior surface of the iris coming into view. Along with these symptoms, a number of red vessels appear in the pupil itself, the largest of which are visible

* "Medico-Chirurgical Transactions, Vol. iv. p. 153. London, 1813."

to the naked eye, but the majority are only discernible by the aid of a magnifying glass. This should be of short focus, and to have the pupil as large as possible, the other eye should be closed during the examination, and a little of a filtered solution of extract of belladonna dropped on the affected one an hour previously.

The red vessels observed in the pupil always form a sort of vascular wreath, situated about a quarter of a line's distance from the pupillary edge of the iris; this wreath forms a concentric circle within the pupil, and consists of a number of vascular arches. To it numerous vessels run in a radiated form from the circumference of the capsule; others, but not always, seem to extend from the pigmentum of the iris; in other cases, vessels seem to be prolonged from the capsule into the posterior surface of the iris. Those running from the iris to the capsule, always arise at a little distance from the edge of the pupil, on the posterior surface of the iris, so that nearly a line's breadth next the pupillary edge is free from these vascular sproutings. From the vascular wreath, vessels are seen spreading towards the centre of the anterior capsule, again forming clusters and arches. No doubt all the vessels at different parts of the capsule are continuous. Posterior to the red vessels seen in the capsule, there appears in some cases a net-work of more delicate vessels, which seem to be seated in the lens itself. The larger evidently come, says Professor Walther, from its posterior surface directly forwards, and then divide into branches. He has repeatedly seen these vessels in the lens, and they constitute a very beautiful phenomenon. He thinks that their existence is morbid. It would appear that all inflammations of the lens begin in the capsule, a fact which Professor W. considers as analogous to the spread of inflammation to the capsule from the ciliary processes or from the iris.

At the apparent termination of several of the vessels in the capsule there are distinctly perceived little knots of a whitish grey semi-transparent substance, evidently coagulable lymph, and explaining the manner in which opacities of these parts are formed. The anterior hemisphere of the capsule, where the vessels are very numerous, sometimes assumes a peculiar velvety or flocculent appearance, and in one or more spots of its extent presents a grey or brownish colour. These brownish spots appear in some instances to be merely effused lymph; but in other cases they probably owe their origin to the iris having been united to the capsule by partial adhesions, which being separated in one way or other, part of the pigment of the iris has remained adherent to the anterior surface of the capsule.

Where inflammation of the lens and capsule is severe, vision is indistinct and confused, particularly when the eye is directed towards distant objects; those nearer are seen as through a fine gauze which does not seem red, nor are the objects tinged so. This ophthalmia is always chronic, proceeding slowly, and attended with little pain. When this does exist it is seated at the bottom of the orbit, in the forehead, or in the crown of the head. When the disease has continued long the blood-vessels in the lens and capsule become varicose, and permanently remain so. In one case Mr. M. has seen incomplete amaurosis, with tremulous iris, follow this disease. Effusion of fluid between the lens and capsule, and dissolution of the former are not unfrequent consequences; and, in other instances, the inflammation appears to run on to suppuration, for in the variety of cataract called the *cataracte cum bursa* the opaque state of the lens and capsule is combined with a cyst contained within the capsule and filled with pus. The causes of this ophthalmia have not been sufficiently investigated; in one case Mr. Mackenzie observed it in the right eye of a keen sportsman. Inflammation of the lens and capsule approaches nearer to iritis than any other ophthalmia, but is much less severe and much less under the influence of treatment.



In the early stage of the disease depletion, counter-irritation, and alteratives seem indicated, in the latter stages tonics. With our author, this has proved the most obstinate of ophthalmiæ, even mercury appearing to have scarcely any power.

### IX. INFLAMMATION OF THE HYALOID MEMBRANE.

Though the morbid states with which we meet in the vitreous humour naturally give rise to the supposition, that its investing membrane must occasionally suffer from inflammation, and though other considerations would lead to the same conclusions, yet such inflammation has not been observed with sufficient accuracy to warrant description.

### X. TRAUMATIC OPHTHALMIÆ.

Each texture of the eye has been shewn to suffer in its own way from inflammation, excited without any mechanical or chemical injury. The inflammation, on the other hand, excited by such injury, may attack one or several of the textures of the eye; when thus excited the ophthalmia imitates the ophthalmiæ already described. Traumatic iritis very closely resembles the rheumatic; the cornea, by traumatic inflammation, is rendered opaque, or becomes affected with onyx or with ulceration; and so on. Upon this hint we may act in our treatment; traumatic iritis, for instance, is to be treated exactly as the syphilitic or rheumatic; puriform traumatic inflammation of the conjunctiva, precisely like catarrhal ophthalmia. The consideration of the former varieties of ophthalmia will teach us to understand perfectly the effects of mechanical and chemical injuries, and though the symptoms may vary very greatly in severity, yet the inflammation of each texture presents, under whatever circumstances, the same essential phenomena.

The most important general rule in the treatment of the traumatic ophthalmiæ is, that we should be upon our guard against effects that may be produced, but are not yet present, and against effects implicating the interior structure of the organ, though the injury seems to be superficial. Our treatment must be preventive; we must not wait till severe sclerotitis sets in, but bleed from the moment of a severe injury—nor till the pupil is evidently closing, but apply belladonna to prevent it—nor till the iris grows discoloured or lymph is effused into the pupil, but put the patient on calomel and opium, if we apprehend from the nature of the injury that iritis is likely to ensue. We sometimes meet with severe sympathetic inflammation in the eye which has not received the injury. It must be observed that, after all the other symptoms of severe traumatic inflammation of the eye have been removed by depletion, &c. a very troublesome and obstinate intolerance of light, with epiphora, is apt to remain, apparently

from continued and now habitual excessive activity in the lids and lachrymal gland. In such cases, in addition to the usual remedies for epiphora, Mr. Mackenzie has derived advantage from the internal use of the extract of stramonium.

### XI. COMPOUND OPHTHALMIÆ.

Strictly speaking, few ophthalmiæ are absolutely simple. Many are strikingly compound, as the catarrho-rheumatic. Strumo-catarrhal ophthalmia is also very common; and we find phlyctenular conjunctivitis with strumous iritis, strumous corneitis with iritis, and many other compound ophthalmiæ. The treatment of such cases will of course consist in the combined use of the means adapted to the separate or simple ophthalmiæ. Thus, in strumo-catarrhal cases, we require the treatment necessary for strumous ophthalmia in combination with that for catarrhal conjunctivitis, and so on.

### XII. INTERMITTENT OPHTHALMIÆ.

"Although several interesting cases have been recorded of ophthalmiæ recurring in the same individual after longer or shorter intervals of time, yet I doubt whether there is sufficient ground to admit the existence of any disease of this kind so regularly periodic in its accession, as to warrant the appellation of *intermittent ophthalmia*. The pain which attends many of the ophthalmiæ, is undoubtedly subject to regular nocturnal exacerbations, but this does not entitle these diseases to the appellation of intermittent. By an intermittent or periodical ophthalmia, I should understand one which recurred with considerable regularity at intervals of weeks or months, and apparently not from accident, but from concatenation with the revolutions of time; whereas, if we examine the cases which are recorded as being of this kind, we shall find that they are nothing more than instances of some particular ophthalmia recurring more or less frequently in the same individual, in consequence of his repeatedly exposing himself to the same, or to some similar exciting cause. The strumous ophthalmia, being that which is most apt to be renewed on slight exposures, will also more frequently than any other inflammatory disease of the eye appear to be periodic. The rheumatic, catarrho-rheumatic, and catarrhal will also be subject, from their ready occurrence in eyes once affected with them, to the same suspicion. I have frequently treated patients who at intervals of three or four months, or once a year nearly about the same season for several successive years, had suffered an attack of rheumatic iritis; but in every case of this kind, I have been able to trace the return of the disease to some new imprudence. In arthritic inflammation of the eyes, the periodic tendency will also appear to be very decided, for every attack of that sort leaves the eyes worse than before, and with a strong disposition to suffer again from renewed causes of excitement.

These remarks, will, I think, be confirmed by a careful perusal of the interesting narratives of Dr. Curry and Dr. Bostock, both of whom had suffered from repeated attacks of severe ophthalmiæ." 481.

We have now arrived at the limits which we proposed to ourselves at the commencement of this article. The subject of the ophthalmiæ is concluded, and though Mr. Mackenzie proceeds in his next chapter to consider the diseases consequent on the ophthalmiæ, we cannot follow him at present. We have been careful to give Mr. Mackenzie's sentiments on the affections rescribed in this and the preceding article, precisely yet fully; for, as we before remarked, there is scarcely a practitioner who will not, at some time or other, and with more or less frequency, be called upon to



treat them. We need scarcely remark how serious the consequences of ignorance may be, not only to the patient but to the practitioner himself. It is because this subject is one of such general, such vital importance, that we have dwelt on it so long. We have offered no critical remarks, for our object has been to communicate the opinions and practice of an experienced ophthalmologist to those who stand in need of such information, and whose *res angusta domi*, will not permit them to purchase the work itself. We do not imagine that Mr. Mackenzie is right on all points: were he so he would be little less than a phenomenon. Neither do we consider his book a vast fund of originality, in which every page is redolent with discoveries. A great part of its contents, nay, by far the greater part, will be found in other authors on the Diseases of the Eye, in the highly valuable volumes of Travers, Saunders, Guthrie, Lawrence, &c. But the divisions of ophthalmic surgery are arranged with more precision, and the doctrines laid down with more method and order in this than in most other works; and as it suits our purpose we make use of it. From time to time and on various occasions we shall select separate chapters or sections for analysis. We again conclude by recommending all who can afford it to purchase this very useful treatise.

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## VII.

**OUTLINES OF PHYSIOLOGY, WITH AN APPENDIX, CONTAINING HEADS OF LECTURES ON PATHOLOGY AND THERAPEUTICS. By *W. P. Alison*, M.D., Professor of the Institutes of Medicine in the University of Edinburgh. 8vo. pp. 452. Blackwood, Edinburgh, & Cadell, London, 1831.**

IN taking up this work, we trust that neither the author nor the reader will anticipate, that we purpose bringing before the one the substance of an elementary treatise on physiology, or that it is our intention to scrutinize, with the minuteness of very detailed criticism, the claims of the other to the merits of an able and advantageous performance. We are sick and sorry when we say it, but physiology in any form is among the least vendible articles which we take to market in these miserly days of greedy money-making, and although we might be discharging a wholesome and honourable duty, were we to stop and reason with our readers upon their shameful indifference to physiological discoveries and physiological discoverers, yet if it be true, as we believe it is, that all our reasoning on this subject would be utterly lost upon nine-tenths of those whom we address, we must feel it to be more imperatively our duty, both as regards them and ourselves, not to enter into any dispute upon the matter. The day is fast coming, when a knowledge of physiology will be considered somewhat more substantial than an ornamental fringe in the texture of a physician's education, and when to be able to discover and to remedy deranged function will be considered as indispensable, as to detect and to renovate impaired structure; but at present we fear that we must suffer the *amor nummi*, which is so epidemically pre-

valent, to subside, ere we can raise our voice to any very audible elevation in behalf of one of the most useful, yet one of the least cultivated sciences in medicine. He, who is determined to learn nothing which cannot directly increase his revenue, will not be very likely to hearken to our admonitions, and he, who can study physiology on its own account, does not require them; so that in passing on without further preface to the work before us, we shall not defraud the former by declining to advise where exhortation would not be received, and we may please the latter by not attempting to tender advice where it is felt to be unnecessary.

These Outlines of Physiology contain eighteen sections, to which is added an appendix comprehending lectures on pathology and therapeutics, which, it appears, are to constitute the ground-work of another volume. The first eleven sections are devoted to the grand nutritive functions of organic life; and in the remaining seven, which engross nearly half the book, are considered the more purely animal and metaphysical faculties. In a few important preliminary observations, with which he prefaces his description of the "laws of vital contractions," the Dr. observes—

"As the phenomena of life are seen only in bodies more or less organized, it has been conjectured that they depend merely on organization; but when we inquire how organization has been effected, we find that it implies in every instance, where we can observe it, the previous existence of vitality; and therefore must be regarded as one of its effects, not as its cause.

On the other hand, the supposition entertained by others, of a *material substance*, such as an etherial or subtile fluid, superadded to organization during life, and producing the phenomena of life, is both unsupported by evidence, and useless in the explanation of facts.

Setting aside both these hypotheses, we hold that all physiological inquiries are intended only to *ascertain the conditions, under which the various phenomena of Life take place*, and naturally terminate in a reference to certain *Laws of Vitality*, or ultimate facts in this department of nature; just as the investigation and explanation of phenomena in the inanimate world terminate in a reference to certain Laws of Motion, of Gravitation, of Chemical Affinity, &c. Of such first principles in science we can give no other account, than that they depend on the will of the AUTHOR OF NATURE; but the determination of such first principles is the main object, and the applications of them constitute the details, of all sciences; and every science is thus mainly conversant with principles *peculiar to itself*." 4.

This distinction between vitality, as the cause of organization and not its effect, has been sadly overlooked, and the oversight has led many physiologists into errors of the most serious description. It is true that we can know little if any thing of life, and therefore it may be vain to study it. Its phenomena are palpable, but its essence is veiled in mystery. Its operations are intelligible, but its seat and essence are utterly unknown. All this, no doubt, is true, and it is to be feared that the very admission of these facts has encouraged some into the suspicion, that life is a mere congregation of phenomena—the sum of certain vital processes—a mere name—a concise and convenient term whereby to express an assemblage of ascertained and acknowledged circumstances. Such physiologists deny its entity. They call it nothing. They hold that in the strict language of philosophy it is a phantom, a fancy, a creature of convenience, and that we have no reason for thinking otherwise, until forsooth our dissection-knife have revealed to us



its texture, and until we can measure and weigh and handle it as we do any other piece of material substance.

Now, it may be philosophy, which cautions us not to dare to be wise beyond what is certainly known; but it is incredulity, which prevents us from believing all that is clearly demonstrated; and we have just as much evidence of the entity of life, as we have of soul, or of spirit, or of any other agent, whose existence is known only through the medium of its operations. It is life, which deposits, organizes and supports the constituent textures of the animal frame; it is not the constituent textures of the animal frame which generate life. Brain and nerve, blood-vessel and muscle are secreted under the agency of life, are organized by the power of life, and are renovated when impaired by the pure instrumentality of life. No animal process can commence in the fœtus, or continue in the adult without the operation of this active principle; and it is a sad confusion of all etiological relations, which ascribes to the passive and naked effect the very existence of the agent, to which this effect owes its being. Life is antecedent to organization, and organization when properly understood implies its pre-existence. Life generates life, and although organization is found in inseparable connexion with life in the present state of being, we see no necessary brotherhood between them, for it is not only conceivable but probable, that life exists without organization, although organization cannot exist without life. While, therefore, it may be philosophy to predicate nothing of life as an independent entity, because, never having seen it separate from matter, we know nothing of it in the abstract; it is neither philosophical nor courageous to permit this fear of knowing too much to keep us ignorant of every thing, and because we are unable to analyze the vital principle with the precision of a chemical result, to dismiss the subject from consideration by denying it existence altogether.

"The explanation of many of the phenomena of living animals is still very imperfect: but enough has been done to shew, that the principal laws regulating these phenomena must be ranked under three heads: 1. Those of *Vital Contractions*, by which the visible movements of living animals are chiefly effected: 2. Those of *Vital Affinities*, by which the chemical changes peculiar to living animals are determined, and their physical structure maintained: 3. Those of *Nervous Actions*, by which the physical changes in living animals are placed in connexion with Mental phenomena, and subjected to the control of Mental acts.

Of these, the vital affinities are perhaps the most general and the most fundamental; but they are the least understood, and, in the higher animals at least, their exercise is dependent on internal and vital contractions; and the laws of these contractions are, therefore, properly to be considered first." 5.

Our author's views upon the connexion, which is supposed to exist between muscular action and nervous energy, although not solitary, are somewhat peculiar. It is well known that, according to some, muscular fibre depends for its faculty of contraction upon some influence derived from the brain and spinal cord; while it is maintained by others that, although muscle does not derive this power from nervous energy, yet it is so far dependent on it for the existence and exercise of this faculty, that all stimuli, which excite muscular fibre to contraction, act upon it through the nervous filaments with which it is supplied. The Professor strongly opposes both these views, and the arguments upon which he rests his opposition, it must be admitted, are neither few nor feeble. In contradiction to the

first doctrine he contends, that contractility is found in vegetable and in the lowest tribes of animal life, where no traces of a nervous system are discoverable;—that children have been born without brain or spinal cord, and yet their muscular system was in undiminished possession of this contractile power;—that circulation can be continued in warm-blooded animals after both the brain and spinal cord are destroyed, by keeping up an artificial action within the lungs;—that after the nerves, which supply voluntary muscles, are divided, although the operation relieves such muscles from their subjection to the will, yet they may afterwards be made to contract by applying stimuli to themselves, and contractions may be excited as long in such muscles as in those, whose communication with the brain and cord is entire; and, lastly, that neither the heart, nor any other strictly involuntary muscle, can be deprived of its contractility by cutting the nerves which immediately supply them. Such are the Doctor's leading objections against the first view. His objections to the second we shall give in his own terms;—

"To the *second* of the theories above stated, it appears a sufficient objection to state, that our only reason for supposing an intervention of nerves to be concerned in muscular contraction, is the excitation of that contraction by stimuli applied to nerves. But a conclusion which is rested on this fact, must be limited to the cases in which this fact holds good. Now, there are *many muscles* (viz. all or almost all those that are destined to *involuntary motion* only), which, although exceedingly irritable, *are not excitcable by mechanical irritation of their nerves*. Even Galvanism, applied exclusively to the nerves of these muscles, has generally failed to excite them; and in the instances where galvanism, so applied, has had some effect, it appears probable that the nerves acted only as conductors of the galvanism to the muscular fibres themselves. When experience shews, that some muscles are excitable by irritation of their nerves, and others not, we cannot acquiesce in the proposition that nerves furnish a condition essential to the irritation and vital action of muscles in general.

We must therefore set aside both the hypotheses above mentioned; and in so doing, we necessarily limit the meaning of the terms 'Nervous Energy, Nervous Influence, Innervation,' &c. in reference to the connexion of vital movements with nerves, to a degree, of which many of those who use these terms do not seem to be aware.

It remains that, on this point, we acquiesce in the judgment of HALLER*, as the only generalization yet admissible, of the facts known in regard to it, viz. That the *vital power of Muscles is inherent in themselves*, and in no case dependent on Nerves; but is liable to affection in two distinct ways, by changes in certain parts of the nervous system, whether these are produced by physical or mental causes;—being *directly excited in many muscles*, and *increased or diminished*, or *variously altered*, probably *in all muscles*, by such changes." 15.

We have always considered the experiments of Wilson Philip, and of those physiologists who have endeavoured to establish the independence of the blood-vessel upon the nervous system, as obnoxious to one common objection, which has been seldom if at all sufficiently urged. When they have separated the heart from its nerves, and removed it from the body, they have imagined that, because its auricles and ventricles have continued to act for some time, the muscular tissue of this organ is endowed with a

* "See particularly Elem. Physiol. lib. 17, sec. 2, § 7."



*vis insita*, peculiar to itself, to which it is indebted for its power of contraction. But, without attempting to give either a name or a nature to the nervous energy; without calling it a fluid, or prescribing any specific limits beyond which it may cease to operate, is it not natural to imagine, that if it exercise any influence whatever upon the circulating system, that influence must be more fixed and permanent than to be instantaneously annihilated by any experiment, which does not annihilate the nervous system itself? When the heart of a living animal is removed from the body, the operation does not separate this organ from the supply of nervous influence which it is supposed to have contained before the separation was effected;—it only cuts it off from the source and continuance of this supply. The nervous influence, which it *has* received and which it *does* contain, is not annihilated by the experiment, and therefore until this supply shall have been exhausted by the activity of the organ, and until it can be shewn that this activity continues to exist *after* the period of this exhaustion has been completed, it should not be said that the heart can act without nerves, or is independent of the nervous system. After the heart is removed from the body the capillary arteries continue to propel their contents into the veins, the lacteal and lymphatics carry onwards to the heart their nutrient current, muscular fibre contracts and oscillates for a considerable period, and every part of the frame, which is endowed with a moderate share of sensibility, not only answers for a time to the application of stimuli, but continues to exhibit some of the properties of life, or, as the Doctor would say, "vital contractility" after the general system has expired. All this proves—not that the capillary arteries and absorbents and muscles can discharge their respective functions without nerves—but that the nervous influence—whatever it may be—with which these textures are supplied, operates within them for some time after apparent death, and endowes them as it were with a *post-vitam* existence of their own. What seems to us to go far in confirmation of this view is the fact, that this excitability survives the general extinction of life for a very short period in any case; that after death by lightning this excitability is simultaneously and equally destroyed with every other animal function; and that it may be almost instantly exhausted by applying to the excited texture electricity, galvanism, or such other active stimuli, as are known strongly to excite and rapidly to exhaust nervous energy.

That muscular texture possesses a vis insita peculiar to itself, is, we think, extremely problematical. It is no argument to the contrary to maintain that vegetables are endowed with contractility, although we cannot discover in their composition nervous tissue; nor that the lower tribes of animals exhibit mature and contractile power, without any ascertained supply of nerves. The lacteals existed in man from the days of Adam till the time of Acellius, yet they remained undiscovered; and until Rudbeck demonstrated the lymphatics at a still later period, that extensive and important system of vessels was utterly unknown. Shall we say, then, that in any animal system, exhibiting muscular fibre, blood-vessel, contractility and motion, there are no nerves, merely because we cannot see them; or that in the mimosa sensitiva, which betrays as much irritability of temperament as the most delicate and nervous constitution, its sensibility and contractile power are wholly independent of every thing like nervous influence? Any argument drawn from this source is purely negative, being no more than an *argumentum ad ignо-*

*rantism*, and when we consider the extreme darkness in which we are upon points of the greatest interest in physiology, we can build no very enduring opposition to one theory on the basis of another, which is supported not by what we know, but by what we do not know.

The two original objections, which were advanced against the doctrine which we are now considering in the days of Haller—that the heart sympathizes with emotions of the mind, and is abundantly supplied with nerves issuing from more sources than one—possess the same cogency at the present hour which they had at first; and, although the amount of our information upon this point may not entitle us to specify the precise limits of connexion, which obtain between the nervous and blood-vessel systems, still that there is a connexion and one of very considerable intimacy, many facts and very many phenomena conspire to prove. The great difficulty in this question—with us at least—is clearly to ascertain that department of the nervous system, which more immediately influences the heart and arteries, and the exact extent to which this influence operates. There is reason to believe that the heart exists in the fœtus prior to the brain, and that the majority of the arteries are deposited before the spinal marrow can be discovered. If this be so, the heart and arteries should be more immediately connected with the ganglionic system, and all our far-famed experiments upon the brain and spinal cord—our slicing and pithing and pricking and singeing these organs—to ascertain what effects such treatment might produce upon the action of the heart, must go for nothing, being directed towards the wrong quarter. The heart we know is one of the principal muscles of the organic life, and *a priori* it were reasonable to imagine that its nerves would be principally derived from that system which mainly supplies the organs of interior life; and if the pre-existence of the heart and arteries can be fully established, the circulation must be greatly independent of this system, and so far the school of physiologists, to which Dr. Alison pertains, may be borne out in their opinions. The experiments of Le Gallois, no doubt, prove sufficiently clearly that the heart can act for a considerable time after the brain has been destroyed; and Wilson Philip's experiments also prove, that both the brain and spinal marrow may be broken down and scorched with a hot wire, and yet the heart's action continue, provided artificial respiration be established; but the ganglionic system still remains to be considered, and we suspect that the important fact will soon be established, that the heart's life, motion and energy depend immediately, if not exclusively, on nerves belonging to the ganglionic or organic system. Brachet, in his late admirable work upon the functions of the ganglionic system, has in our opinion done much to settle this point; but as a more special and a fitter opportunity will, probably, soon offer to the writer of these remarks for entering with more minuteness into this highly interesting subject, we shall decline to add to the few general observations, which have been thrown out, *en passant*, in noticing this portion of the Professor's Outlines.

It is now, we believe, very generally admitted, that absorption is not exclusively performed by lacteals and lymphatics; but that this function is at least occasionally exercised by capillary veins. Dr. Alison strongly advocates this extra faculty of the venous capillaries.

"The experiments of HUNTER, made by exposing and isolating small portions of the intestines of living animals, filling them with different fluids, chiefly milk and a solution of indigo, and then examining the contents of the lacteals, and of the veins leading from these, may be allowed to prove two points: 1*st*, That absorption, at least of milk, and probably of other fluids, different from chyle, took place in his trials by the lacteals; 2*dly*, That no absorption could be ascertained, in his trials, to have taken place by the veins.



The first of these, which is a positive observation, although opposed to the results obtained by MAGENDIE and others, agrees with the results of many other experiments, by LISTER, HALLER, BLUMENBACH, TIEDEMANN and GMELIN, LAWRENCE and COATES, and FODERA, in which it appeared that a certain portion of different fluids, introduced into the intestines, was taken up by the lacteals; and the possibility of their absorbing fluids different from chyle may, therefore, be held to be decided. But the second observation of Mr. Hunter, which is a negative one, is quite an insufficient ground for the general conclusion, that veins do not absorb; and the reality of venous absorption is now put beyond all doubt, by the positive observation of many physiologists, particularly by the following.

1. The experiments of Sir E. HOME and Mr. BRODIE* prove, that when the great lymphatic trunks are tied in warm-blooded animals, substances injected into the stomach quickly find their way into the circulation, and may be detected in the urine.

2. Experiments made by MAGENDIE, FLANDRIN, TIEDEMANN and GMELIN, and others, prove that odoriferous substances, known by their smell, and saline substances, indicated by their tests, after being taken into the stomach, are detected in the veins on the mesentery, both larger and smaller, and in the vena portæ, much more than in the lacteals and thoracic duct.

3. Experiments made by MAGENDIE, prove that a poison introduced into an isolated portion of intestine, communicating with the rest of the body only by an artery and vein, or into the cellular texture of a similarly isolated limb, acts in the usual way, and nearly in the usual time, when the circulation is free.

4. In experiments made by SEGALAS, it appeared that a poison introduced into a portion of intestine between two ligatures, failed of effect as long as the artery and vein leading to that portion were tied, although the lacteals and other textures were uninjured, but took effect as soon as the circulation was set free.†

5. In experiments made by Professor MAYER, it appeared that saline substances introduced in small quantity into the bronchiæ of animals, found their way very quickly into the blood, although the thoracic duct was tied, and were detected in the left side of the heart much sooner than in the right side.‡

6. In experiments by FODERA,§ it appeared that two saline solutions, applied to the inner and outer membrane of an isolated portion of intestine in a living animal, *were united in the small veins* leading directly from that portion of intestine.

7. In experiments by MAGENDIE, it appeared that a poison applied to an isolated vein, with all precautions to avoid contact with other textures, or even to an isolated artery, gradually transuded into the interior of the vessel, and then produced its usual effects.

8. In cases of disease where large deposits of morbid matter have taken place within a short time,—in cases of Suppuration, of Fungus Hæmatodes, and of Melanosis, the veins of the affected parts have been found loaded with the morbid matter, more generally than the absorbents.

It would appear, therefore, that the veins are concerned in the function of

* Phil. Trans. 1808. † Journal de Physiologie, 1822.
‡ Bibliotheque Universelle, Jan. 1818.
§ Recherches Experimentales sur l'Absorption et l'Exhalation.

absorption in all the following ways:—1. They themselves absorb, chiefly by their smallest branches, at least fluid matters. 2. The contents of the lacteals and lymphatics are probably partially intermixed with those of the veins in lymphatic glands. 3. Some of the smaller lymphatic trunks terminate in veins. 4. The largest lymphatic trunks terminate in the great veins of the neck." 84.

Since the appearance of Wilson Philip's work on the vital functions, it has been very fashionable to believe, that nervous influence is identical with the galvanic fluid, or that the relationship between the laws and properties of these two principles is so close, that the effects which they produce upon the animal frame are strikingly alike. Although there may be more than plausible appearances to countenance this theory, it appears to us very far from being so settled by demonstrative experiments, as to warrant the general adoption which it has received from the profession. Galvanic excitement is the strongest stimulant which can be applied to the muscular fibre, and after all other forms of stimuli have ceased to operate upon the dead body, an electric shock can still awaken its irritability, and stimulate the muscles into violent contortions. But if galvanic be the same with nervous influence, or even a tolerable substitute, why can we not preserve the irritability of muscle after it has been separated from its nerves, by means of this agent for an unlimited period? Why does the stomach digest food for a very short period only, after section of the eighth pair of nerves, although it be regularly supplied with galvanic influence; and why will muscular irritability ultimately cease, although it be unremittingly excited by electricity? As long as galvanism is applied, contractility and secretion should proceed if these functions depend upon the action of nerves, and if galvanic influence be the same with nervous energy; but in despite of this stimulus, they speedily cease, and not only cease, but, what is strikingly worthy of attention, cease more speedily in cases where this stimulus has been applied, than in those where no artificial efforts have been made to prevent its exhaustion. Although we are very far from believing in many of Dr. Calvert Holland's conclusions, in his Experimental Inquiry into the Laws of Organic and Animal Life, still the experiments, which he has performed upon the par vagum, in our opinion wholly overturn the conclusions of Wilson Philip in favor of the identity of galvanic and nervous influence, which he has drawn from experiments upon the same nerve. It is now quite certain that the stomach can digest its contents after section of this nerve, or even excision of a part of it, if the trachea be previously divided, or—what we have found equally sufficient—if an aperture be made in the windpipe, large enough to contain a tube of the size of an ordinary female catheter. It would appear, therefore, that indigestion follows section of the eighth pair, without this precaution, principally, if not wholly from the derangement which occurs in the pulmonary functions; and that galvanism, in restoring the digestive process, acts only as a local stimulant which may be entirely dispensed with, if the lungs be suffered to carry on their functions without impediment.

Again, if galvanism and nervous influence have any properties in common, how does it happen that the former can act upon muscular fibre through some nerves only, and not through all? From the experiments of Haller, Fontana, Bichat and Mayo, it would appear that the heart and intestines are unaffected by irritating the nerves which immediately supply



them; and Bell, Magendie and Beclard have shown that scarcely any muscular contractions can be excited by the posterior portions of the spinal nerves or the ganglionic department of the fifth nerve, although strong muscular action may in this way be elicited through the anterior spinal nerves, and through the third, fourth, sixth, eighth, ninth, and part of the fifth and seventh central nerves. Were galvanic fluid generated in the human body by the contact of nervous with muscular texture, it should be elicited from all nerves, if not equally yet in some degree; and could galvanic fluid supply the place of nervous energy, it should not happen that one class of nerves are obedient to such stimulation, while another class, which are equally indispensable to muscular action, wholly refuse to convey to the textures they supply the galvanic stimulus. The Doctor does not devote much space to this subject, but we are glad to find that the observations, which he makes upon it, are characterized by that prudent discrimination and dislike of theory, which mark not only the present volume, but all the preceding investigations of the author.

"Although we gave reasons for thinking that Secretion and Nutrition are truly independent of nerves, yet several facts show, that physical impressions on, or injuries of, the nervous system, materially and variously *influence these functions*, as well as the circulation in the small vessels, which are their seat. This kind of influence of physical impressions on nervous matter, is also imperfectly understood, and not easily distinguished from the effects of mental acts; but it seems exemplified in the following instances:

1. The effect of section of the eighth nerve in the neck, in not merely suspending the secretion of gastric juice at the stomach (which is a somewhat ambiguous case), but also in exciting a degree of inflammatory action there; in preventing the usual effusion of mucus in the intestines, even when arsenic has been swallowed;* and, on the other hand, in exciting inflammation, and increasing the mucous secretion, in the lungs and bronchiæ.†

2. The effects (viz. inflammation, ulceration, and sloughing), produced on the eye-ball, and in some instances on the membrane of the nose, and on the gums, as was first ascertained by MAGENDIE, by section of the fifth nerve, which supplies these parts; and likewise, in a less degree, by section of the sympathetic nerve in the neck,‡—effects which have also been seen, in some cases in the human body, from disease of the fifth nerve.

3. The inflammatory condition, with increased and altered secretion, of the mucous membrane of the bladder, in many cases of paraplegia, dependent on injury of the spinal cord.

The diminished nutrition and diminished secretions (*e. g.* by the skin), often observed in a limb which has been for some time palsied, by section of its nerve, or disease of the brain, may be thought to illustrate the same point; but these effects are perhaps sufficiently explained by the total inactivity of such a limb.

It is to be observed, that such effects as those now stated, on secretion and nutrition, have been observed only in certain parts of the body, and chiefly from injury of certain of the nerves supplying these. These are the sentient nerves of the parts in question; and the secretions which are changed, are generally such as are habitually excited by irritations producing sensation. It is still

* Brodie, Phil. Trans. 1814.

† WILSON PHILIP, l. c. SWAN, Essay on the Connexion between the Action of the Heart and Arteries and the Nervous System.

‡ See DUPUY, Journal de Medecine, t. xxxvii.

doubtful, whether the whole of the effects of these injuries on secretion and nutrition may not be explained by these considerations.

These statements of physical phenomena, however, illustrate the very peculiar powers, known only by their effects on other parts of the animal frame, which the Nervous System in living animals possesses. Only one theory, in explanation of these powers, appears to deserve attention, viz. that which ascribes them to Galvanism, evolved in the animal frame, especially by the contact of nervous with muscular substance. It is known that, by the contact of these substances, galvanic phenomena, in a slight degree, may be produced; and that galvanism, however evolved, is a powerful stimulant of muscular contraction,—in an excessive degree, is a powerful sedative,—and has also appeared frequently to influence the capillary circulation and secretions.

It appeared also, in some experiments by Dr. EDWARDS, that when the nerve and muscle of a frog were laid on a good conductor of electricity, irritation of the nerve had much less effect in exciting the muscle, than when they were laid on a non-conductor; which he ascribed to the galvanism supposed to be excited in the nerve being carried off by the conductor of electricity in the former case, and therefore not affecting the muscle.*

But whatever be the true explanation of this fact, the following general objections may be stated to the Galvanic theory of Nervous actions, such as we have hitherto considered them.

1. The causes which excite, in the highest degree of intensity, those changes in nerves by which muscles are excited (*e. g.* such causes as bruising with a probe, or pricking with a pin), seem quite inadequate to the production of a sudden and powerful galvanic influence.

2. We have seen that these causes do not act on all nerves, and through them on all muscles which they supply, but only on the nerves of certain muscles, and only on certain of these nerves.

3. We have seen that the power of exciting muscular contraction is so far from residing in nervous substance in general, that it resides on one surface of the spinal cord, and not on the other,—nor in its centre; nay, it resides in one part of a nervous fibre, in the medulla oblongata, and not in another part of the same fibre, half an inch higher in the brain.

4. While the changes in the nervous system, which excite muscles to contraction, take place only in certain parts of the nervous system, those which exalt or depress the vital power of muscles, appear to take place especially in others, and therefore affect especially other muscles; and the same cause (*e. g.* a violent concussion) which produces one of these effects exclusively in one nerve, may produce the other in another nerve immediately adjoining it.

These facts seem sufficient to show, that if it be galvanism which enables nerves to act on muscles in the living body, it is galvanism excited by means, and subjected to laws, very different from what we observe in examining the galvanic phenomena of dead matter. And this is equivalent to saying, that nerves act on muscles in the living body, in virtue of certain *vital powers*." 150.

With this very short and imperfect notice of Dr. Alison's *Outlines* our readers must rest satisfied, as it is utterly impracticable to lay before them, in the present place, any adequate epitome of a volume of physiology, which is literally crowded with general statements and abstract facts. Written more immediately for students, and professedly as heads of lectures, it is not to be expected that much illustration and detail would be introduced, nor that the professor would often stop, while sketching the leading outlines of his course, to enter into original investigation or lengthened argument. When the subject is especially interesting he occasionally dilates, or when

* "Ann. des Sciences Naturelles, t. v."



the view in which he is indulging is considered open to dispute, plausible objections are anticipated and the leading arguments, by which it stands supported, are carefully laid down; but even then conciseness and generalization are observed, and the reader is never permitted to forget that he is merely perusing the sketch of a performance, which the author intends to fill up with more minute research in another place. This much we have deemed it necessary to specify, as some superficial readers, forgetting the original aim of the writer, might consider many of his subjects unfinished, and some of them scarcely more than entered on. While, however, this work is to be regarded as an unfinished outline, which a course of lectures are intended to clothe with illustration and detail, it must be equally useful to the full grown physiologist, as to the mere student; for while it prepares the latter, by its general enunciations and leading statements, for entering into the more minute and mysterious labyrinths of the science of function, the former can advantageously refer to and depend upon it, for an able, concise, and correct exposition of the principal facts of his favourite science, which his more matured attainments can seldom fail to amplify with appropriate illustrations. It is written with the true spirit of an experimental philosopher. Unsupported theories are seldom noticed and never dwelt on; ascertained facts are carefully and fully stated; naked speculation is constantly avoided, and, although the Doctor is by no means innocent of novelty in some of his doctrines and opinions, yet he candidly adduces the authorities which exist against him, and briefly but fairly enumerates the arguments and facts by which they are opposed.

There can scarcely be a doubt, but that outlines so ably sketched will be ultimately filled up by the pen which drew them; and knowing as we do the industry, impartiality, and sound judgment of Dr. Alison, physiology could not but reap a harvest from his labors, were they only limited to a philosophical *digest* of our present system; of all the sciences, which are included within the curriculum of a medical man's education, none is so obnoxious to false facts and delusive fancies as physiology; and it were a question of no trifling difficulty in its present state to decide, whether he who adds to its real discoveries, be a greater benefactor than he, who sweeps from its table of contents all the crude imaginations which crowd and cumber it.

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## VIII.

## ON DISEASES OF THE LIVER AND ITS APPENDAGES. By *M. Andral.*

[Pathological Anatomy, Vol. II.]

In the 28th No. of this journal, we selected an article from this able work, now rendered accessible to English readers by the excellent translation of Drs. Townsend and West, as a specimen of the performance. We now proceed to give an abstract of that chapter which treats of the pathological anatomy of the liver.

The diseases of this organ, M. Andral observes, are seated either in the substance or the excretory ducts. He therefore treats of these separately.

### I. Diseases of the Parenchyma of the Liver.

"If we carefully examine (says he) the structure of the liver, we find that it is composed of two substances; one reddish, formed chiefly by the ramifications of the capillary vessels of the organ; and the other white or yellowish, which seems chiefly destined for the secretion of the bile.

In the natural state, these two substances are distinct; but yet a certain degree of attention is requisite to distinguish them. When more blood than usual happens to stagnate in the liver, the distinction between them is lost, and the organ presents a uniform red colour. When, on the other hand, it contains less blood than usual, the yellow substance becomes more apparent, and in some cases the deficiency of blood is so great, that the red substance loses its colour, and the whole of the liver presents a whitish tinge. 583.

These shades of colour may be owing to a mechanical obstruction to the venous circulation, in which case the liver is uniformly red—to the diminution of the total mass of the blood, blanching the organ—or to certain affections of the organ itself, which affect its circulation, and induce a state of hyperæmia or anæmia. Other changes may also take place. Thus the white substance may become hypertrophied, in two degrees—one, where the substance of the organ is traversed by lines or circumvolutions of a yellowish white colour, much more distinct than in the natural state—the other, where both the interior and exterior are studded with numerous granules, either isolated or agglomerated, and exactly resembling yellow wax. These whitish granules he considers to be merely the white substance in a state of hypertrophy.

"While the white substance of the liver is thus preternaturally developed, the red may continue in its natural condition, or may be altered in its colour, which often becomes very pale or olive green; and in its bulk, which may be either increased or diminished. Laennec remarks that *cirrhosis* is often accompanied by a shrivelled state of the liver. The red substance, as it wastes away, becomes infinitely less vascular, and, in certain cases, is in a great measure transformed into cellular or cellulo-fibrous tissue. This state of the liver is almost constantly accompanied by ascites." 586.

The red substance is also susceptible of a remarkable kind of hypertrophy which produces in the interior of the liver small, hard, red masses, which are distinguished from the surrounding parenchyma by their greater consistence and deeper colour. These may be unequal in form and size, or else distributed through the liver, so as to divide it into a number of similar lobules.

### II. Lesions of the Hepatic Circulation.

Hyperæmia is considered by M. Andral as one of the most frequent morbid conditions of the liver. It is sometimes general, and the organ is then uniformly red—its volume increased—and its consistence little altered, when the affection is simple. In many cases the hyperæmia is only partial, forming red spots in different parts, surrounded by paler parenchyma.

"Hyperæmia of the liver is of three kinds.

The first results from a process of irritation. This irritation is sometimes idiopathic, and sometimes subsequent to a similar affection of the alimentary canal.



In the second kind, the blood accumulates in a manner wholly passive in the parenchyma of the organ, just as it does in the gums of scorbutic patients.

The third kind is purely mechanical, being observed where there is any obstacle to the free entrance of the blood into the right side of the heart; the blood then stagnates in the supra-hepatic veins, and *obstructs* the liver.

Congestion of the liver from a mechanical cause is frequently produced in infants while coming into the world; and such of them as die in a state of asphyxia have that organ so gorged with blood, that it sometimes ruptures its vessels and is effused in a layer on its convex surface beneath its investing membranes. M. Billard has repeatedly seen an effusion of blood into the abdomen produced by this turgid state of the liver.

Instead of accumulating in the hepatic capillaries, the blood may escape from its vessels, and become effused into the parenchyma of the organ, thus producing a kind of hepatic apoplexy. Some of these hæmorrhages are owing to the rupture of one of the principal vessels distributed to the liver.* In other cases, however, there is no perceptible rupture of any vessel, all that is observed being a collection of fluid or coagulated blood in one or more points of the liver. This was well exemplified in a liver shewn me by M. Rullier, which, besides various collections of fluid and semicoagulated blood, contained also some of a firmer consistence, in the centre of which were contained several hard fragments of fibrine deprived of their colouring matter. The examination of this liver led me to inquire whether fibrine thus deprived of its colour might not be the origin of certain accidental productions, such as encephaloid and others, that are often found in the liver; and my conjecture received additional confirmation from the examination of another liver shown me shortly after by M. Reynaud, in which I was able to trace the various changes of the blood from the perfectly fluid state until it passed into a substance possessing all the characters of encephaloid." 589.

### III. Lesions of Nutrition.

Hypertrophy and atrophy produce, of course, a change in the size of the organ; while other lesions induce softening or induration. Hypertrophy of the liver is of several kinds, as regards colour, consistence, and form. The colour is sometimes extremely pale—deep red, or variegated, with grey, green, brown, and black tints. The livers of the fœtus and of very young children are naturally in a state of hypertrophy, as compared with the adult. As the infant advances in age, the liver *diminishes* in size—ceases to extend into the abdomen, and retires behind the ribs, below which it does not extend, except when in a state of disease. In some cases, however, the child, and even the adult, retain this natural hypertrophy of infancy. This state is generally connected with other perversions of nutrition, forming altogether the scrofulous diathesis.

"Atrophy of the liver, considered as affecting its substance generally, may extend to the three lobes, or be confined to one, and may be accompanied by induration or by softening.

The liver, when in a state of atrophy, is generally diminished in size; this, however, is not necessarily the case, as it is sometimes as large as, or even larger than in the natural state; but then, in proportion as its proper tissue has disappeared, it has been replaced by cellular tissue. In such cases the organ having lost its peculiar structure and organization, is reduced to its pri-

* Vide *Clinique Medicale*.

mitive frame-work, and large patches are found in it occupied only by cellular tissue, which sometimes becomes hypertrophied, and in some cases contains serous cysts or hydatids, which, far from announcing an augmentation of the organic action of the part where they appear, are perhaps connected with its diminution; the cellular tissue, though unable to produce the hepatic parenchyma, showing its tendency to organization by becoming a serous cyst.

Induration of the liver has long attracted the attention of medical men. It is frequently accompanied by hypertrophy or atrophy of the parenchyma; but it may also exist without either. The liver, when indurated, may be of a lighter or deeper red, or of a grey, green, or brown colour.

Softening of the liver is, at least, as frequent as its induration. There are two degrees of it. In the first, the diminution of consistence of the parenchyma is not perceived until it is pressed between the fingers, when we find that it readily gives way, and is reduced to a pultaceous mass. In the second, which is much more uncommon, the softening is evident to the eye, the tissue of the organ presenting an appearance similar to that given it by prolonged maceration: the vascular apparatus is, in a manner, dissected from the cellular frame-work, and its ultimate branches, deprived of their uniting medium, float in a red or grey pulp, which seems to be merely the hepatic parenchyma reduced to the fluid state.

The softened liver sometimes retains its ordinary colour; in some cases, it is in a state of hyperæmia, and consequently red or brown; and in others, it is remarkably pale, which seems to result from its tissue being modified in such a manner as no longer to admit the colouring matter of the blood, of which there are no traces to be found except in the large vessels."* 593.

### IV. Lesions of the Secretions of the Liver.

The liver is known to secrete a fatty matter, and if this be in too great quantity, it gives rise to certain morbid appearances in the organ.

"The secretion sometimes occupies the whole extent of the organ, and sometimes exists only in some scattered points. Instead of being infiltrated through the parenchyma, it is occasionally collected in some one spot, being deposited there like tubercle or pus, and forming grey or white morbid masses, which thrust back the substance of the liver, and present to the eye and the touch all the properties of fat. Masses like these have been found wholly formed of cholesterine. The causes that give rise to this fatty secretion in the liver are as yet unknown, it being a mere hypothesis to attribute it to irritation." 595.

It is curious that almost all the cases presenting the fatty degeneration, have been consumptive patients—that is, people in whom the blood was no longer properly elaborated, and in whom the pulmonary exhalation could not be accomplished as in the natural state. Hypotheses will not fail to be erected on this foundation.

Of abscesses in the liver there is nothing worthy of notice in this part of Andral's work. The able author says that hepatic abscesses are so rare in these climates that many authors have actually doubted their existence. This is carrying the thing rather too far. Unquestionably the affection is infinitely rare compared with what occurs in tropical climates; but still the disease is seen sufficiently often to dispel all doubt respecting its existence.

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* Vid. *Clinique Médicale*, (Maladies de l'Abdomen.)



### Cancer of the Liver.

This designation is rarely if ever applied to morbid degenerations of the liver in England. It is but fair to hear what M. Andral has to say on the subject.

"Writers have described by the name of cancer of the liver, an alteration of that organ in which certain morbid productions distinguished by well marked physical characters are deposited in its parenchyma. They are those that have been described in the first volume by the names of *encephaloid* and *colloid* matter. They produce in the liver masses of various sizes, that are sometimes uniformly white, and sometimes white mixed with red. Their consistence is not always the same, some of them being firmer than the surrounding parenchyma, and others resembling a greyish pap, in the midst of which a greater or less quantity of blood is often effused. These masses frequently occupy the greatest part of the organ, leaving scarcely a vestige of its natural tissue between them. They occasionally project on its external surface; and the liver then has a knobbed appearance which is sometimes perceptible through the abdominal parietes.

It follows from some facts already mentioned, that these so called cancerous masses may arise from an effusion of blood, which, when coagulated within the substance of the liver, undergoes the various changes I have described. But, it is far from being proved that such is always the origin of these cancerous tumours. In many cases, all that we can discover, is at first the infiltration of a minute portion of the parenchyma of the organ with a whitish matter, the parenchyma being at the same time more or less injected at the point of infiltration or around it. This whitish matter gradually becomes more abundant, and the proper tissue of the organ no longer displays such an appearance of vascularity, though its vessels may still be detected by dissection or maceration; and it is then often discovered that the vessels traversing the morbid mass, which at first appeared to be vessels of new formation, belong to the liver itself. The surrounding parenchyma generally falls into a state of atrophy, but it may also become irritated and inflamed, in which case it often secretes pus, or ulcerates, and in this way produces a communication between the mass of encephaloid and the cavity of the peritoneum or of the intestine." 601.

From the above it is evident that what is termed cancer of the liver by the French pathologists, is the fungus hæmatodes of British anatomists.

### Hydatids.

These are very common occurrences in the liver, and the cysts in which they are contained, are sometimes so enormous as to occupy almost the whole of the organ. The parietes of these cysts are generally composed of fibrous membrane, capable of being detached from the tissue of the liver without tearing it.

### V. Diseases of the Biliary Ducts.

The author sets out with the following passage.

"The biliary ducts and gall bladder are liable to various alterations, none of which give rise to any unpleasant symptoms during life, unless they produce a diminution of their caliber." 602.

M. Andral, of course, excludes morbid secretions, or formations, as

biliary calculi, from diseases of the parts containing them. The lining mucous membrane of the biliary ducts, he observes, is sometimes so swollen, from the effects of hyperæmia, as to contract, or even totally obstruct the passage of the part affected. He has seen jaundice arise from this cause.

"When the ducts have been obliterated for a certain length of time, the gall bladder, which was at first dilated, contracts, the bile is absorbed out of it, and its diminished cavity contains only a little mucous matter, or else is completely filled with calculi.

Under the influence of acute or chronic irritation, the walls of the biliary ducts sometimes become softened or ulcerated, and eventually perforated; in consequence of which the bile escapes into the cavity of the peritoneum. The perforation occasionally takes place in some point behind where the duct is obstructed.

The gall bladder presents the same alterations as the ducts, its walls being found red, ulcerated, softened, or perforated. In this last case, the bile sometimes escapes into the peritoneum, and sometimes is evacuated through a perforation in the integuments." 604.

### VI.—ALTERATIONS OF THE BILE.

We cannot establish any connexion between the alterations of the liver and those of the bile secreted in it. In the majority of those organic diseases which have been described, the bile in the ducts and gall-bladder does not appear at all changed in quantity or quality. In other cases, again, where the structure of the liver does not appear at all changed, the bile is either excessive or deficient in quantity, or altered in its sensible qualities.

"I have sometimes been astonished at the immense quantity of this fluid in the intestines, in cases where they were but slightly inflamed, and the liver did not appear in the least altered.

The reason of the secreting fluid's being altered without the secreting organ's being so, is, that in the liver, as in every other organ destined to separate a fluid from the blood, the alterations of texture that are apparently the most serious, are not always those that exert the greatest influence over the act of secretion; the derangement of this secretion seems to depend rather on certain lesions of the organ that escape our observation, and not unfrequently on the lesions of other parts. Thus, Magendie's experiments have proved that, by changing the food of an animal, we can alter at pleasure the composition of the bile, which is evidently owing to the previous alteration of the blood from the same cause." 607.

Alterations in the quality of the bile may be discovered by simple inspection—by physiological experiments—and by chemical analysis.

"We have long been aware, from experiments on animals, that the bile taken from some dead bodies, produces no other inconvenience when introduced into the living body than an inconsiderable irritation, while that taken from others produces much more serious consequences, and sometimes even death itself. In some instances, it may be touched and tasted with perfect safety; in others, it produces pustules, ulcers, &c., on the tongue and lips. Here, then, we have very important changes in the bile, which we never could have learned from anatomy.

The only alterations in the quality of the bile discoverable by inspection are changes in its colour and consistence. It has been observed to have every shade of colour from the deepest black to an almost transparent whitish tint. Its consistence is also very variable, it being sometimes as thick as pitch, sometimes like glue, and sometimes fluid as water.



We learn from chemical analysis that the different component elements of the bile vary greatly in their proportions. Sometimes, especially in cases of fatty liver, is is found to contain scarcely any thing but water and albumen. At other times, the yellow matter, the resin, or the cholesterine is the predominant principle. The causes on which these variations depend are as yet unknown." 608.

It would be an interesting inquiry, and one far more profitable in practice, to endeavour to ascertain the phenomena produced in the human body by its own bile, in various states of sensible alteration. This part of the inquiry M. Andral has entirely overlooked. We have only room here to make one observation of a therapeutic nature. We recently saw two instances of the most obstinate and long-protracted jaundice, where the patients were reduced to skeletons, and the skin, for many months, the colour of mahogany; and where inspissated ox-gall produced the best effects—tinging the motions, lessening the irritability of the stomach, and increasing the peristaltic action of the intestines. In both instances recovery ultimately took place, after all hopes had been abandoned by physicians and friends.

With the following passage, containing a true statement, and not much calculated to render us very dogmatical in our prognoses and diagnoses, we shall conclude this article.

"It was supposed that jaundice always arose from some obstacle in the biliary ducts to the passage of the bile into the duodenum, but this opinion is incorrect, inasmuch as those ducts are often found perfectly free in persons that die of the disease. Indeed nothing can be more variable than the state of the liver in jaundice; any one of the numerous alterations to which that organ is subject, may be attended by it, but none of them are constantly or inseparably connected with it. There are even cases of icterus where we cannot discover any lesion whatever in the liver or its appendages; and in many such cases we have reason to doubt that the liver had any thing to do with the disease. We are not to suppose, however, that the yellow tinge of the skin can be produced only by the presence of the colouring matter of the bile in the blood, as it sometimes seems to arise merely from a sanguineous suffusion of its tissue. Such, especially, seems to be the nature of the *icterus neonatorum*, in which we can observe the red tinge of the skin gradually changing into a yellow, which in its turn fades away, and is succeeded by the natural colour of the part. Neither can we find in the liver of children that die of this disease any constant lesion that could account for it. Some have asserted, indeed, that in such cases they found the liver gorged with blood; but it is found at least as frequently in the same state where there has been no jaundice at all." 611.

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## IX.

### OBSERVATIONS ON THE USE OF INSTRUMENTS IN CASES OF DIFFICULT AND PROTRACTED LABOUR. By *John Beatty*, M.D. Licentiate of the King and Queen's College of Physicians in Ireland.

[Dublin Medical Transactions.]

THIS is so long and important a paper, that we think it right to dedicate an article to the analysis of it. There can be no doubt that, in 29 cases out

of 30, Nature requires no assistance—at least instrumental assistance, in the process of human parturition. In such cases the accoucheur has only to wait and watch the occurrence of any unfavourable accident, or deviation from the ordinary course. Unfortunately a certain proportion of cases do occur, in which instrumental aid is necessary—and it is therefore our duty to inquire into the merits of the means proposed to assist delivery. It is often a difficult, and always an important task to discriminate between the necessity for instruments and the propriety of leaving Nature to her own course. After a long and active experience respecting the comparative value of the different instruments used in long-protracted labours, our author has formed his own conclusions, and has now been induced to lay a faithful account of his experience before the public. He acknowledges that his opinions on these important subjects, differ from those of some of his most eminent brethren in the obstetric line in his own city; but such difference of opinion must be expected to exist under all such circumstances. The cases in which mechanical assistance is required, may be comprised in two divisions.

"1st. Those where there is a disproportion between the head of the child, and the passage through which it must come; and 2dly. Those in which, although no mechanical impediment exists, the expulsive powers of the mother are not sufficient to accomplish the delivery.

Under the former will be found those caused by the deformity of the bony parietes of the pelvis, and by disease or rigidity of the soft parts, as well as unnatural size of the head of the fœtus, face presentations and transverse position of the head. And under the latter, those in which delivery is delayed by general weakness of the patient, hæmorrhage, frequent faintings, convulsions, great exhaustion, fever, &c.

To assist delivery under such circumstances, two classes of instruments have been devised; 1st. Those by which extraction may be effected without injury to either mother or child; 2dly. Those by which the life of the latter must necessarily be sacrificed. I need scarcely remind the members of an enlightened and humane profession, that the adoption of the latter alternative, is a step calling for the most serious consideration, and one that involves an awful, and heavy responsibility. The value of human life is not to be estimated by the age, nor is there in the eye of the law, either human or divine, any distinction between that of the octogenarian and the child unborn.

It matters little, therefore, what the nature of the situation is, in which a fellow-being committed to our care is placed, whether it be a fever striking him in the prime of life, or a disease requiring the performance of a capital operation, or the perils attending his first entrance into the world, it is our bounden duty to employ such means as will best insure his safety." 44.

By these observations Dr. Beatty would wish to be understood as overlooking, for a moment, the well-being of the mother, in the attempts to save the life of the child—he means that the life of the infant is to be sacrificed *only* when all means to preserve it, consistently with the safety of the mother, have been tried and proved inefficient. The perforator and crotchet were the instruments employed formerly—and, even so late as 1746, Lamotte states that, when surgeons were called in to cases of midwifery they took their instruments with them—"and brought away the child by their means." The circumstance of a woman being in labour a day and a half, or two days, was more than sufficient to set them to work—and this was their only resource in all cases indiscriminately. Fortunately a



revolution, in this respect, was effected by Dr. Chamberlain, who, by the introduction of a harmless instrument, gave rise to an investigation into the true nature of difficult labours, and proved the utility and safety of the instrument. This physician's invention of the forceps brought about a classification of difficult labours, and led practitioners to discriminate between cases in which the life of the child must be sacrificed, and where it may be saved. At present, it is nearly the universal opinion that the perforator and crotchet should be the practitioner's last resource. The necessity for applying the forceps, and the period at which they should be applied, are not so easily settled. The urgency of a case cannot be estimated by the number of hours it has lasted, but by the state of the mother in each individual instance.

"Doctor Denman defines difficult labours to be, 'those in which, although the head of the child presents, the delivery is not terminated in twenty-four hours from the commencement of real labour.' Every practitioner must be aware that such cases are by no means unfrequent, and that the efforts of nature in very many of them, and even in others of much longer duration, are sufficient eventually to expel the child. But when labour is thus protracted, circumstances may, and do often render it desirable, to expedite delivery. These, as I have said, relate not to time, but to the condition of the mother; some women being able to bear a much greater length of suffering than others. In the more simple cases, those that are unconnected with convulsions, hæmorrhage, &c. the state of exhaustion of the mother, and cessation of labour-pains, are the best indications for the interference of art.

Doctor Osborne says, 'that in the state indicating the use of forceps, all the powers of life are exhausted, all capacity for further exertions is at an end, and the mind as much depressed as the body, they would both sink together under the influence of such continued and unavailing struggles.'

Now, to wait for such a period as this, is but to delay the operation, until the chances of success are almost lost; in fact there will be little prospect of any thing, but the removal of a dead child, from a dying mother; and it is such a practice, that has at times, brought this valuable instrument into disrepute and disuse: the want of success has been charged upon the operation, where it ought to be laid at the door of the operator. It is with us in this, as it is with the surgeon in strangulated hernia, the operation should be performed as soon as the necessity for it is found to exist, every moment's delay diminishing the prospect of a successful termination; and it is to this principle that so many happy results from the use of the scalpel in that disease, in modern times, are to be attributed. Let not the accoucheur, therefore, wait until the powers of life are exhausted; his duty is to prevent such an occurrence, and this is to be done by the timely application of the forceps. Delivery with this instrument may be attempted in whatever position the head may be, if it is sufficiently low in the pelvis, while at the same time the os uteri is dilated, or the soft parts are relaxed. As soon as matters are in this state, the practitioner should proceed to delivery without waiting until the mother's strength is so exhausted as to raise alarms for her safety, and oblige him to fly to any means of extraction, without regard to the life of the child. Delay under such circumstances, and running the patient to the last extremity, in giving her and nature (as it is called) every chance, is in my opinion, a main cause of the too frequent use of the perforator. Neque timerè, neque timidè, is the best motto by which the accoucheur can be guided in such circumstances." 50.

By this timely interference, he thinks, the evils attending upon difficult labours, such as contusions, inflammations, and sloughing of soft parts, would be obviated—and as to the bad effects said to follow the use of the

forceps, he has never seen them, when the instruments were properly employed. In looking over his case-book, the author finds that, during 42 years, in which he had practised midwifery, five of which were spent in the Dublin Lying-in Hospital, he delivered 111 women with forceps or lever—and yet, in no instance of these 111 cases, did any unpleasant result follow. None of the mothers died—none suffered laceration of the perineum, nor any of those evils which are set forth as the effects of the forceps. All the children that were supposed to be living at the commencement of labour were born alive, and none had any injury or mark inflicted by the instrument.

"With respect to the operation, no great dexterity is required for its performance; a little management in the introduction of the blades, and patience in the extraction, is all that is required to bring it to a happy termination. The instrument I have always used, is that which is called male and female, from the transverse opening in the root of one blade, through which the other is passed—other practitioners prefer the curved forceps—it is quite immaterial which is chosen, provided they are used in proper time, and with good judgment.

Having ascertained by the rules already laid down, that immediate delivery is desirable, my custom is to empty the bladder and rectum, by the catheter or an enema if required. The patient being placed on her side, as near to the edge of the bed as possible, I proceed by introducing the female blade of the forceps, slowly and carefully over the upper side of the head of the child, until it reaches beyond the ear; this being accomplished, the chief difficulty is overcome, for the male blade being passed through the slit in the female blade, readily applies itself in the proper position, by gently urging it forward under the inferior side of the head. It is of importance to attend to this order of proceeding, for if the female blade were introduced to the under side, it would be difficult, from the relative position of the patient, and the bed, to pass the male blade through it. The application of the instrument usually brings on slight action of the uterus, although it may have ceased for several hours. This I always wait for, and taking advantage of the natural effort, the perineum being supported by the nurse-tender, or my own left hand, I have seldom found any difficulty in extracting the child alive and uninjured, provided it were so previous to the commencement of the operation. The operation as performed in this manner gives so little pain, and delivery is in general so easily accomplished by it, that I have been several times requested by patients, with whom I had previously employed forceps, to use them in subsequent labours." 53.

Our author has been called in to many cases where the perforator was ready on the table for the destruction of the fœtus, but where he brought it safe into the world by the forceps. It is no uncommon circumstance, he observes, to see children born alive and cry, whose heads had been opened, and the brains partially destroyed! Dr. Burns relates cases where children have lived in this mutilated state for a day or two. Mr. Dease states instances where "the child has been miserably dragged alive into the world, with a great part of the brain evacuated."

"Similar instances have (I understand) occurred in this city, in one of which humanity prompted the accoucheur to plunge the child into a vessel of water, to put an end to its existence and cries.

I can never forget a scene of horror to which I was a witness in the year 1800. I was called upon to see a very young lady, in labour of her first child, who was under the care of one of the oldest and most eminent practitioners in this city, (since dead;) her labour was most violent, which she bore with great impatience and noise. The head had been down on the perinæum (he said) several hours; I proposed to give more time, and an opiate, not doubting the powers of nature, or to try the forceps, which he declined, on account of its being her first child, and the apprehension he entertained of her being exhausted; and finally, he opened the head. The operation, as it always does, excited extraordinary uterine action, and before it was well concluded, or the brain evacuated, so as to lessen the bulk of the head, the child was propelled into the world alive and crying.

The old gentleman whose patient she was, was a person of very fine feelings, and the reader may imagine his sufferings on viewing the effect of a rash and ill-judged operation; he declared no earthly consideration should ever induce him again to witness the application of the perforator. 55

Some cases are next detailed, of which we shall abbreviate one or two.

*Case* 1. Mrs. M. aged 30 years, and very corpulent, took labour of her first child on the 28th November, early in the morning. At 6, p. m. the membranes burst; and from this date he commences the labour. The pains continued to increase in severity and frequency for a period of 68 hours, during the whole of which she had not slept, or taken any sustenance except a small quantity of whey. Her strength was considerably exhausted. The head was now sufficiently low in the pelvis—the os uteri dilated—and the external parts relaxed. The Doctor then applied the forceps, and waited for a pain, on the occurrence of which, he gave assistance, and a living boy was brought into the world without a scratch. This was a case, he thinks, where there was no likelihood of the labour being over for several hours, if left entirely to Nature, during which time there would have been considerable danger both to mother and child.

*Case* 2. Dr. B. was called to a patient who had been upwards of twenty-four hours in severe labour of her first child. The head was pretty low in the pelvis, though not on the perineum. The head of the child was much swollen, and Dr. B. had some difficulty in introducing the forceps, and then waited for a pain, three of which occurred and were assisted, without extraction. The fourth effort was successful, and a large living boy was born.

This was a case, Dr. B. observes, in which the head would certainly have been opened by those who are prejudiced against the forceps. The occurrence of convulsions, in cases of difficult parturition, has been considered as affording a sufficient ground for immediate delivery by perforation of the head. Without wishing to delay too long where the mother is in imminent danger, Dr. B. thinks that many lives might be saved, under such circumstances, by the forceps—especially as this last instrument does not require so long time as the perforator. The following case is given in illustration.

"In the year 1814, a gentleman, residing eighteen miles from Dublin, called on me, to request I would accompany him with all expedition to see his wife, who had been suddenly seized with labour of her first child, attended with convulsions before he left home. We reached his house in about five hours from the time he left it. I found the lady lying on the parlour-floor, labouring under severe convulsions, and quite insensible, in which state she had remained dur-

ing her husband's absence. On examination, the head was found to be low in the pelvis, and the os uteri dilated. Without removing her I introduced the forceps, and in a few minutes succeeded in extracting a female child alive. The mother was now removed to bed; the convulsions ceased in a short time; her senses were restored, and the recovery was as speedy as if no untoward circumstance had occurred. I may observe that the gentleman had no more children, and the child then born is now alive, and heiress to his large estates; a consolation of which he must have been deprived, had I rashly employed a destructive instrument. If I had experienced much difficulty in this case, I would have thought myself justifiable, nay, called upon, to sacrifice the child, but certainly not until I knew it was unavoidable; and I state it to show that in the worst of cases, the milder means may be resorted to with considerable prospect of success." 59.

Dr. Beatty cautions us against drawing conclusions too precipitately from the real or estimated measurements of the head and pelvis, as reasons for craniotomy. It is not true that every female with a distorted spine has a deformed pelvis. We should endeavour to ascertain whether the deformity commenced before or after puberty. If the former, then there is reason to conclude that the pelvis has participated. If it did not come on till after the growth of the body was completed, we may hope to find no deformity in the pelvis. It is truly surprising to witness the degree of compression which the head of a child will bear without detriment. Dr. Denman relates the case of a child, born alive, with a depression full an inch in depth, on the left parietal bone, occasioned by a projection of the os sacrum. But the depressed part gradually rose, and, in a few months, regained its original level.

Dr. Beatty's paper is certainly deserving of the serious attention of the obstetric practitioner.

## X.

## On Polypi of the Heart as an Idiopathic Affection, and a Cause of Death. By *W. Harty*, M.D. &c. &c.*

When we look around us and survey the intellectual and moral vigour of this most surprising age, and the strides which have been made within the last few years in almost every department of useful human knowledge, we cease to regret that the more recondite and abstract heights of science would seem to be less occupied in England than they were. The present times are distinguished for the general diffusion of moderate information, rather than for the brilliant achievements of individuals. We shall not stop to enquire if this be better or worse for mankind, as such discussion is wholly foreign to our purpose at present. What is true of the whole, must be true of the part, and thus it is that our own profession participates in the relations of the other classes of the civilized communities of the world. At present we have no imperator in science, but many are co-operating for the common good, and numbers are contributing to the accumulation of knowledge and experience. The cultivation of morbid anatomy has wrought an immense

* Dublin Medical Transactions, Vol. I. Part I.



change in the face of medicine and revolutionized its realms. We have derived already great benefit from investigation of the dead after study of the living, and, when the bulk of the profession have become yet better informed than they now are, when facts are more rightly observed and more accurately recorded, who knows where the chain of advantages may end, what useful discoveries may be made.

The diseases of the chest have received great attention in every age in which physic has been studied. Yet we might almost venture to affirm, that more has been done in the short period that has elapsed from the days of Corvisart to the present, than in fifty preceding centuries. This speaks volumes for morbid anatomy.

Polypi of the heart have long been a theme of contention with physicians and physiologists. It is not wonderful that in former times the most extravagant and idle notions were entertained upon the subject, nor is it to be marvelled at that modern researches should dissipate those unreal fancies. Yet we must not rush on too fast, we should not rashly exchange the extreme of credulity for the extreme of scepticism. If ancient physicians have seen in polypous concretions in the heart the cause of diseases which had no dependence on them, or connexion with them; many modern surgeons have precipitately asserted that their formation occurs only in the agonies of death. More researches, more facts are required to decide this point.

Dr. Harty, of Dublin, has endeavoured to add to the stock of information we possess, and relates some cases, calculated, in his opinion, to throw light on the investigation. We shall notice them with as much conciseness as possible.

*Case* 1. Miss R. æt. 14, of phthisical family, had been subject for some years to chorea, which had yielded to active purging. In December, 1814, she had a return of the disease, and, after a sudden alarm, it was aggravated with fever, palpitation, and dyspnœa. By free purgation and a bleeding to ℥xij. she was greatly benefited, and a relapse in February was successfully treated in the same manner. In March she was attacked with inflammatory sore throat, with night delirium, some dyspnœa and palpitation, and pain on pressure in the epigastric and right hypochondriac regions. She was bled and took calomel and James's powder with relief, though the action of the heart was still violent, and required digitalis with purgatives. In April, after exposure to cold, she was again attacked with fever, dyspnœa, palpitation, œdema of the face and a papulous eruption; the urine was scanty and high-coloured. A bleeding and blister procured some relief, but on the 4th she complained of cough, more dyspnœa, palpitation increased by lying on the left side. *Five leeches.* The bleeding from the leech-bites was very free, and she was relieved by them; she was ordered digitalis. On the 6th, the action of the heart strong, preferred lying on the right side. In the evening the pulse was 120, hard, and "communicated a peculiar thrilling, whizzing sensation to the finger, on touching any, the minutest artery in the body."* *Bled to a pint.* The blood was buffy, the pulse

* We suspect a little of the enthusiastic eloquence of the Emerald Isle in this passage.—*Rev.*

softer after the V. S. On the 7th the breathing was quick, the pulse 120. *Bled to* ℔j. *and again to* ℔j. *in the evening.* Lying on the left side excited incessant cough. On the 8th she had no pain, the cough was softer, the pupils dilated, and she had vomited. *A blister would not act.* In the evening the pulse was 106, hard, the skin hot and dry—*V. S. ad* ℥viij. *Another blister.* In the night she was thought to be dying, but next morning the respiration was not so panting; she now lay perfectly horizontal, and the palpitation was greatly increased by the erect posture. In the evening of the 10th she died.

On a hurried examination of the body, the lungs were found free from inflammation, and there was very little effusion into the pleural cavity. The liver was of large size. The pericardium exhibited some little appearance of inflammation, and contained about 6 ozs. of clear serum, without any lymph. The heart was hypertrophied and dilated, the vessels on its surface full of blood. A distinct polypus of a whitish colour, unconnected with any coagulum, nearly filled the right auricle and ventricle, its branches extending into the great vessels, adhering very slightly. A thick membranous substance, of the colour of the polypus, adhered with much firmness to the side of the ventricle opposite the septum, penetrating into its interstices, and binding down the valve. Both auricle and ventricle were of vivid red colour and "inflammatory aspect." The left ventricle was divided into two nearly equal cavities by an adventitious whitish membrane, firmly adhering to the internal apex, and to the sides of the ventricle, and terminating towards the aorta in a rounded organized polypus, which entered above an inch into the aorta. The two cavities into which the ventricle was thus divided communicated with each other very partially. The side of the membrane towards the left auricle was uneven, towards the aorta smooth. The auricle had the same inflammatory appearance as the right; its valves and those of the aorta were impeded by the polypus; three of the columnæ carneæ were much enlarged. The Doctor adds to the case a small row of queries.

"What was the nature and extent of the injury inflicted on the heart, in the first instance, by the terrors of the December storm? Was it then a general or partial affection of the organ, or was the nucleus of the disease then formed? Is there not under all the circumstances of the case reason to conclude, that the polypous membrane of the left ventricle had priority over that of the right, and that the great aggravation of the symptoms, together with the peculiar sensation imparted by the pulse, was caused by, or was concurrent with, the extension of the polypus into the aorta? Was inflammation or hypertrophy of the heart a cause or an effect of the polypous concretions?" 233.

*Case* 2. Master M. æt. 13, was attacked on the 14th Dec. 1818, with measles, then epidemic, and very fatal. He was twice bled to ℥viij. but on the morning of the 16th tracheitis suddenly came on, for which he was bled, leeched, blistered, and took calomel and James's powder. In the evening the face was livid and œdematous, the dyspnœa great, the pulse 140. *Warm bath—emetic—blister to sternum.* On the 17th the tracheitis was relieved, but there was pain in epigastrio, particularly on pressure. *Hirud.* viij. *epigast. Vesic. inter scap.* In the evening the respiration was more hurried, and there was palpitation for the first time. *V. S. ad* ℥vj.—*blister to throat—warm bath.* On the 18th, respiration was freer, but there was



pain in the epigastrium. *V. S. ad* ℥vj.—*digitalis.* In the morning of the 19th the breathing was easier, he lay horizontal with ease, the eruption of measles had altogether disappeared; there was œdema of the face and slight emphysema of both arms. In the afternoon the skin was hot, the breathing more oppressed, and he complained of noise in the ears. *V. S. ad* ℥vj. The pulse now began to impart to the finger the peculiar wiry sensation noticed in the former case. *V. S. in the night, ad* ℥xj. Next day the thrilling was more distinct, "imparted by every artery" however small, and even felt through the thick muscles of the extremities; the arms and thorax were emphysematous. The medicines were now changed for purgation and the warm bath. On the 21st the chest, arms, and spine were emphysematous, and there were pain and soreness at the region of the heart, aggravated by inspiration. *Hirud.* vj.—*digitalis—emp. canth.* On the 22d he lay on the left side without uneasiness. Delirium now set in. On the 23d he lay horizontal, and was evidently sinking. In the morning of the 24th he died.

*Sectio Cadaveris.* "There was a considerable depression of the sternum, forming an arched hollow between the mammæ; a fact obvious to the eye during life. There was also unusual thickness of the sternum from the point of elevation upwards; there was slight adhesion of the left lung to the pleura in one or two points; also, a slight degree of adhesion near the junction of the two lobes; the external coat of the pericardium was evidently inflamed, though not to any great degree or extent, and there was about an ounce of serous fluid in the pericardium. The liver was enlarged in its dimensions, though by no means to the same extent as in the former case; it was otherwise apparently healthy, while the heart itself appeared larger than was compatible with his years, and the general structure of his frame. The left ventricle and auricle of the heart contained a large and singular polypus, unconnected with any coagulum, and adhering firmly in some parts, and more loosely in others. In the auricle (properly so called,) it adhered firmly throughout, maintaining a perfect union therewith by a number of lateral projections, and thence descending into the ventricle by a long and narrow neck, it formed a flat and firm adhesion to the side of the ventricle, throwing out at the same time a band, whereby it was connected to the polypous concretion which loosely occupied the apex and body of the ventricle, and extended thence into the aorta. The body of the auricular polypus branched largely into the pulmonary veins, and in its thickest portion contained a distinct, dense, and compact clot of blood, enveloped therein." 239.

Now it is on these cases that Dr. Harty builds his diagnosis of polypi in the heart. The symptom which he considers as peculiarly characteristic is the peculiar thrilling or whizzing sensation communicated to the finger by every artery in the body, as well as by the heart. When it occurs he concludes that the polypus has entered the great vessels issuing from the heart, and he ingeniously allows that polypus may exist in the heart without this diagnostic sign, *provided* it has not entered the valves. After some critical observations on the opinions of Senac, Bertin, and Laennec, Dr. Harty relates the case of Mr. Holder, referred to by John Bell, as "liker this disease than almost any other." It is given by Mr. Cheston, of Gloucester, in Simmons' London Medical Journal, for the year 1785. It will probably be new to our readers, and is worthy of perusal.

Mr. Holder was a surgeon-apothecary, in extensive and laborious practice, and had for four years before the fatal termination of his malady in 1775, experienced occasional pain and distress in the thorax on any great exertion—"of late how-

ever (i. e. a few months before death,) his pain extended farther into the right side and upwards towards his neck, where he was constantly sensible of a noise," similar to that of "a stream of water passing over obstructions, or forcing a passage through a narrow confined place." The gushing noise in the thorax became so strong and loud, that he often expressed his surprise at its not being heard—the pain at times was very great, and greatest when noise was least.—"That gush, he used to say, was his friend: while gush stood by him he should live." Pressure on the carotid artery relieved the noise, but it produced increase of pain. The pulse was hard and contracted, without the least intermission, and what was singular, the motion of the heart was not to be felt, though repeatedly searched for.—Having sustained a severe bilious attack, he experienced some remission of pain, and the apex of the heart was felt after it. As his strength declined, he found himself much more at ease by continuing almost constantly in an horizontal posture; he had good and bad nights with some regularity—on the latter, the motion of the heart was so languid, that he could not vary his position without the greatest caution; unless this was attended to, the circulation became confused, and, as it were, wholly carried on in one corner of the heart, which, at such times, beat with a "whizz." I omitted to mention that there was also "noise in the ear like dashing of water."

On dissection, the right auricle was found much enlarged and very thin, "with strong marks of inflammation," and the right ventricle nearly transparent. On opening them they were totally void of blood, and "a considerable quantity of air rushed out." At the upper part of the right ventricle from between the columnæ carneæ there arose a broad concretion, adhering firmly to the columnæ, about the thickness of half-a-crown, of a light yellow colour, very dense consistence, and occupying about two-thirds of the diameter of the cavity—then it rose into the auricle, and thence nearly four inches into the vena cava superior, one into the inferior, and also into the pulmonary artery; the branches not so firm as the main body. Another small concretion of darker colour, and more tender consistence, arose from the columnæ carneæ of the left ventricle, passing into the aorta about 1½ inch.

Such we may say broadly are the facts on which Dr. Harty grounds two separate propositions:—first, that polypi of the heart, exist as an idiopathic disease; and secondly, that the symptoms to which he and we have adverted are characteristic of its existence. Our own opinions on the subject may be of little consequence to others, but still, though perfectly open to conviction, we do entertain opinions. We believe that polypi may be formed in the heart for a longer or shorter time antecedent to death; but we do not consider that their existence as a distinct disease, *per se*, has yet been satisfactorily proved by Dr. Harty, nor, so far as we know, by any one else. Such is our conclusion from the premises, but the means of judging for themselves are before our readers and the profession in general.

We have said that polypi may exist in the heart, for a longer or a shorter time antecedent to death, and all who are practically conversant with morbid anatomy will allow that the period must be very various, its ascertainment extremely difficult. As a general law, we may assert that when patients are long in *dying*, polypi, presenting more or less of the appearances of maturity and age, will be found in the chambers of the heart. From simple black coagulum, we pass through all grades of their formation till we arrive at the brownish-red, lancellated substance, adhering firmly to the walls of the heart, almost apparently organized, even containing in its centre what has been, perhaps improperly, considered as pus. It cannot then be doubted or denied that polypi may be and are formed before the dissolution of the



patient. Of the law which determines and regulates their formation we know little, but of the circumstances under which they are found we know more. They are witnessed in those who have been long in the agonies of death, who have been gradually sinking for hours or for days. A disease may be rapidly fatal and yet the act of dying may be long; a disease may be slowly mortal, and yet the final struggle may be brief. So far then, as we have seen, polypi have presented the characters of perfection and duration in proportion to the period during which the patient was sinking, and we think we have remarked that they are more mature when much depletion has been used. Supposing this last observation correct, it would be readily explicable on the ascertained principle, that blood-letting promotes the coagulation of the blood.

It may be asked, if we have any determinate symptoms produced by these formations. Now it is a singular and important fact, that of all who assert the existence of polypi as an independent disease, no two agree in the symptoms which they assign to it. Senac, Laennec, Bertin, differ; Mr. Cheston said a noise in the ear was the sign, Dr. Harty pronounces that it is a thrilling in the arteries. When none agree, common sense whispers that probably all are wrong. Dr. Harty endeavours to prove the inaccuracy of all former diagnostic marks; we will urge an objection or two to his; and then it remains for the next author to advance *his* certain sign, to be overthrown in a similar manner. A fact, to be admitted, requires two sorts of proofs, positive and negative. Let us test Dr. Harty's in this manner. In the most marked instance of polypous formation in the heart which we ever witnessed, we can positively assert that there was no thrilling whatever in the arteries. This is negative proof against Dr. Harty. Secondly, the peculiar thrilling in question is present in many cases of external aneurism, can be felt in all the tangible arteries of the body, and not unfrequently disappears altogether after the operation. It is also observed in hypertrophy of the heart and a roughened state of the coats of the aorta, and may exist for months and years. We have felt it in rheumatic pericarditis, diminishing or subsiding with the subsidence of the attack. This looks very like positive proof against Dr. Harty.

On the whole then, in the present state of our knowledge, it is safer not to consider polypi as a distinct disease, it is wiser not to pronounce upon their symptoms. When a patient is long in dying, that is, sinking, we may suspect that, they will be discovered, but farther than this our positive information scarcely extends. We do not wish to dogmatize. Dogmatism is the test of error, the foe of truth. But rational scepticism is better, in all cases of inductive reasoning, than easy confidence or hasty faith.

## XI.

## ON DYSENTERY, ITS FORMS AND CONSEQUENCES, IN WARM CLIMATES, ESPECIALLY IN INDIA. By *James Annesley*, Esq.

[Vol. II. of Diseases of India.]

WE have reason to lament, in common with the profession generally, but more especially those who are scattered over our Indian possessions, that the inestimable work of Mr. Annesley was not published separately from the plates, and consequently in a form that would have insured these expensive volumes an extended circulation. Had it not been for the medium of this Journal, the volumes might almost be said to be buried; but we have endeavoured to diffuse a great portion of the valuable materials with which they are fraught, through both hemispheres, and shall not cease till our object is accomplished. We have brought our analysis up to about the third of the second volume, where the important subject of dysentery is taken up by the experienced author. We need not advert to the importance of a malady which forms the prominent feature of tropical diseases, and carries off more Europeans than any other form of disease whatever. The author treats first of the simpler or less complicated forms of dysentery—then of that variety which is characterized by attendant hepatic disorder—and, lastly, of the chronic forms, and on scorbutic dysentery.

### SECT. I. ACUTE UNCOMPLICATED DYSENTERY.

Collections of excrementitious matters, Mr. A. thinks, form one of the earliest pathological states which give rise to acute dysentery, by irritating the mucous membrane, and inducing inflammation, followed by ulceration and even sphacelation, if the case be neglected.

"In a great many cases, this form of dysentery is preceded by a constipated state of the bowels, often of long duration, especially among persons who have recently arrived in India. To this condition frequently supervenes mucous diarrhœa, attended with pains of the abdomen, coming on at intervals, and generally preceding the alvine evacuations. This form of diarrhœa may continue for two or three days, passing gradually into dysentery, with all the characteristic signs of the disease. In a few instances, especially when the evacuations are copious, the diarrhœa subsides, and the patient recovers without experiencing, at least for that time, a true dysenteric attack. This result seems to arise from the irritation produced upon the mucous surface of the large bowels by the fæcal accumulations having subsided, in consequence of the irritating matters having been removed, and of the copious secretion which had taken place.

Frequently, the dysenteric symptoms are present from the first hour at which the patient complains, the stools being then scanty, mucous, streaked with blood, and attended with abdominal pain and tenesmus. In cases of this nature, the increased action of the muscular coats of the bowel, especially about the sigmoid flexure and rectum, prevents the passage of the fæcal collections through their canal, and, in many cases, occasions a complete obstruction, little passing away but the perfectly fluid secretions. In cases of this description, if the disease be not early subdued by very decided treatment, sloughing of the mucous coat often takes place, followed by involuntary motions, when the fæcal accumulations at last come away, such parts of them, at least, as have been dissolved being washed off by the watery secretions poured out from the irritated vessels of the inflamed surface." 153.



Believing this form of dysentery then to be essentially an inflammatory disease, whatever its cause, our author takes occasion here to dissent from the late Mr. Bampfield in respect to the subdivisions of the disease which that gentleman adopted. "The mild, the severe, and the inflammatory varieties which he has marked out, are, in our opinion, nothing more than varying degrees of the same, or nearly similar pathological states, proceeding from the extent to which the inflammatory action may have *supervened*, from the susceptibility of the system to sympathise with the local disease, and from the peculiarity of individual constitution. There is no line of demarkation by which these varieties can be separated from each other in practice."

Viewing the acute and uncomplicated form of dysentery, then, as an inflammation limited chiefly to the cæcum, colon, and rectum, Mr. A. proceeds to paint its various degrees of intensity, as presented in practice among recently arrived Europeans, in older residents, and among the natives. We shall here introduce the description which he draws.

"Simple dysentery, in its least severe forms, generally commences with frequent calls to stool, the motions being scanty, mucous, gelatinous, streaked with blood, and accompanied with pain and tenesmus. At first the pain seems chiefly limited to the rectum, occasional griping pains being only felt in the abdomen. The tongue is often but little affected, farther than being white and loaded; the pulse sometimes at the beginning not materially accelerated, but it generally soon becomes affected to an extent varying according to the habit of the patient and severity of the disease. If the disorder be not subdued in this early stage, all the symptoms become more acute; the pain in the abdomen increases in severity and is more constant, yet, in many cases, little or no pain is complained of, excepting at the time when the patient is passing a motion, although the stools are of the most morbid character, and the disease altogether of the most severe form. This, however, ought not to be imputed to the absence of inflammatory action; for the mucous surface of the cæcum, colon, and rectum, may be inflamed, and, indeed, in a state of ulceration, and yet but little uneasiness, even upon firm pressure of the abdomen, is apparently felt. This seems to be owing to the varying degree of excitability and sensibility with which the human frame is endowed, and, perhaps, to some modification in the condition of the diseased parts, beyond the detection of our unaided senses. Yet, in many cases, where pain is either entirely absent, or but little complained of, a sense of heat in the abdomen, especially in the course of the colon, is very generally felt. When this symptom is present, it ought always to be recognised as indicating the existence of inflammation of the mucous surface of the bowel. A similar inference ought also to be deduced from a sense of soreness in the abdomen. This symptom is very often present in all the stages of the disease, and always indicates great irritation of the mucous surface. It frequently accompanies the sensation of heat, or supervenes to that symptom. (See the case of Thomas Morgan, at the end of this section.)

As long as the disease is limited to the mucous lining of the large bowels, the patient seldom feels more than a sense of heat, or a dull aching pain, not increased on pressure, which he usually describes as being heavy, and shooting at times through the whole abdomen: but when the cæcum is minutely examined, pain, to a greater or less extent, is always felt, and, perhaps, some degree of fulness, even when pressure over the transverse arch of the colon occasions no

uneasiness. If the left side of the abdomen, beneath the ribs, be grasped in the hand, so as to embrace the descending colon and sigmoid flexure, pain is sometimes felt, but not always; but when the right side is similarly grasped, so as to press upon the cæcum in opposite directions, then pain is almost always complained of. If the practitioner takes the patient's report without further examination, in cases of this description, he will often be misled.

As the disease advances, the stools usually become still more frequent, the tenesmus more severe, the discharges of blood greater and often more intimately mixed with the matters evacuated, which gradually pass from a mucous, slimy, and gelatinous character, to a more watery appearance, of a dark colour, with a muddy solution of feculent matters, and sometimes with considerable discharges of fæces. The urine is now, and often early in the disease, of a high colour, voided frequently, and attended with scalding. Sometimes complete strangury is present: this is owing to the intimate connexion subsisting between the urinary organs and the seat of disorder. The tongue becomes more loaded and excited; the pulse more accelerated; and the skin harsh, hot, and dry. Tormina also, and the straining, increase; the calls to evacuation become more incessant, especially during the night, when the general febrile symptoms also are augmented.

When the straining and tenesmus are very urgent, we may then consider the rectum to be very remarkably inflamed: indeed, we know not of an instance where such a state was not evident when these symptoms were present. If tenesmus be very severe, in any particular instance, and if the patient presents but little abdominal fulness or tension,—if he complains but little of tormina, or of heat and soreness in the abdomen,—if he can bear pressure without uneasiness being produced about the region of the cæcum and sigmoid flexure of the colon,—we may then consider that disease is chiefly seated in the rectum, and that the large bowel is comparatively exempt, or at least much less affected than the rectum. But although this inference may be drawn, especially if there be little constitutional disturbance present, we ought not to depend upon it with certainty, and we should never allow it to seduce us into the adoption of weak measures of cure.

We have often seen the most extensive ulceration in the cæcum and colon, and yet the patient had not complained of tenesmus, the rectum having been comparatively sound. (See the case of Thomas Dunn, detailed at the end of this section.) And we have seen tenesmus to a great and distressing degree, the colon, throughout its extent, being, upon *post mortem* examination, found little disordered, and the disease confined to the rectum. From these circumstances, therefore, we have during the latter years of our practice, especially when tenesmus has been urgent, considered it merely as characteristic of disease of the rectum, although frequently an attendant upon dysentery, and treated it accordingly, whether it arose at the commencement of the disease, or during the advanced stages." 157.

We shall not follow the author in his remarks on dysentery as it affects the natives of India. In them, as might be expected, the disease assumes lower or more asthenic form, though the appearances after death, are nearly the same in both classes.

In simple acute dysentery, the number of calls to evacuate the bowels varies from ten or twelve, to thirty or forty times in the twenty-four hours—many of the stools being merely a small quantity of mucus and blood—some of them more copious, and consisting of various morbid secretions as well as excretions. These fluid motions rapidly exhaust the strength of the patient. These watery evacuations, Mr. A. thinks, are indicative of "the lodgment of acrid matters in the bowels requiring to be removed by purgatives at the commencement of the attack." Of this we have some doubts.



The author indeed tells us immediately afterwards, that, "in some cases, the disease seems to commence in the rectum, &c." The appetite is sometimes so little impaired in simple dysentery, that ulceration of the intestines has taken place before food was loathed. But food generally produces great uneasiness in the line of the bowels, even where the appetite is unimpaired. After a number of minute and rather tiresome observations on various phenomena presented by the disease in question, Mr. A. proceeds thus:—

"Besides the appearances of the stools already pointed out, there are others which are less constant, and which deserve notice. The evacuations are sometimes of a singularly variegated hue, consisting of a glairy mucus, mixed with a greenish, gelatinous substance, sometimes with pure bile, at other times with a muco-purulent matter, with large pieces of albuminous-like concretions formed upon the internal surface of the bowel and afterwards detached, and either with streaks of fluid blood, or with dark coagula, more or less intimately mixed with the other matters discharged. Blood is occasionally evacuated in very large quantities, fluid, and distinct from the other matters composing the evacuation: it then flows from the lower parts of the large bowels. When consisting of coagula, and of dark, grumous clots intimately mixed with the discharges, we may consider it as having proceeded from the upper parts of the colon, or from the cæcum itself. The discharge of pure blood sometimes takes place early in the disease, and continues to its termination in death, (see James's case); but this intestinal hæmorrhage is seldom of a florid hue: it most frequently presents the venous character, and occasionally a dark-brown, muddy appearance, mixed intimately with watery, feculent, and offensive dejections. The copious sanguineous discharge may or may not proceed from an ulcerated surface. We believe that it most frequently exudes from the irritated mucous surface, and that the latter description of discharge is characteristic of ulceration, and occurs most frequently in persons who have neglected the state of their bowels, or who have indulged in the intoxicating liquors of India, which are so destructive to soldiers." 163.

The mucous membrane of the rectum or colon is sometimes detached, in the latter stages of the disease, and discharged per anum in a tubular form. Most frequently, however, these membrane-looking tubes are exudations of coagulable lymph thrown out upon the inflamed surface of the bowel. When dysentery has advanced to the most unfavourable stage, the stools are streaked with purulent or sanious matters, evidently proceeding from ulceration of the bowels. We pass over a great mass of cases, and tedious details that are spun out to an immeasurable length, when we come to a section on—

### HEPATIC DYSENTERY.

This is a form of the disease remarkably prevalent in India; consequently, its nature and treatment are of the utmost importance. This species of dysentery assumes various forms—is sometimes acute, sometimes subacute—or chronic. The more acute forms are generally accompanied by an affection of the liver, and a highly vitiated condition of the biliary secretion—while the chronic forms are attended by abscess and other organic changes of that viscus. Mr. Annesley does not attempt an explanation of this connexion of hepatitis and dysentery, nor to the precedency of one in respect to the other. The two phenomena, indeed, are often so coeval, that it is difficult, or rather impossible to ascertain the priority of one or the

other. While wading through many pages of heavy quarto, presenting loads of the most insipid verbiage, and where the everlasting word "*supervene*" occurs in almost every sentence, we have been unable to find a passage to extract, or matter for condensation in our own language. What could infatuate Mr. Annesley to dilute his facts with such an ocean of words?

"In many cases of hepatic as well as of simple dysentery, the patient presents, for a day or two, many of the symptoms particularized in the section on the premonitory signs of disease contained in the First Volume of the Work, page 209. But this is not uniformly the case. The countenance is often pale, the skin cold, with horripilation, sickness, and loss of appetite, and a disordered, costive, and irritative state of the bowels. The patient often, at the same time, complains of a sense of chilliness, coldness or uneasiness in the back and lumbar region, running down the sacrum, sometimes as far as the anus, with griping pains through the abdomen. These symptoms, however, seldom fall under the observation of the practitioner, unless he makes it a duty to inquire particularly into the condition of the men under his charge during health; for it is not generally until the phenomena pathognomonic of simple or complicated dysentery are fully developed, that medical advice is sought after. In those cases of hepatic dysentery in which the complication is immediate, or disease nearly coeval in both organs, the premonitory signs now noticed are often well marked, the griping pains extend through the abdomen and hypochondria, and are sometimes attended with vomiting, a sense of fulness and oppression at the præcordia, lowness of spirits, and slight dyspnœa.

At the commencement of this particular form of the disease, and generally following the above symptoms, the alvine dejections become frequent, and at first are usually copious, but morbid, both in colour, consistence, and odour. At this period they are very seldom either mucous or bloody, but they are generally very dark, crude, and offensive. As the disease advances, they vary daily, but are generally green, bottle-green, greenish brown or black, mixed with venous blood; sometimes slimy and watery, with a greenish frothy slime on the surface; rarely clay-coloured, and not infrequently, especially in the advanced stage of the worst cases, reddish brown, ochre-like, or consisting chiefly of water, with blood more or less intimately diffused through it. The motions vary in frequency and in character, according to the stage of the disease and the treatment adopted. There is generally urgent tenesmus present, with scalding of the anus, and often *prolapsus ani*. The calls to stool are more frequent during the night, and attended with more or less irritative fever and restlessness. Sometimes the blood is so very intimately mixed with the other matters forming the alvine evacuations, that it must have proceeded either from the superior portions of the alimentary canal, or from the liver itself. But this is an appearance observed chiefly in the far advanced stage of the disease, when also the evacuations often resemble the washings of raw meat, and present nearly similar characters to those marking the last period of the simple form of the disease. The urine is generally in very small quantity, high-coloured, muddy, and evacuated usually with pain and difficulty.

In addition to this state of the alvine excretions, the patient generally complains of a fixed pain, weight, or uneasiness, in the pit of the stomach, increased on pressure, and frequently extending to the right hypochondrium, and beneath the right scapula. There are usually also present tension, and a sense of pressure at the hypochondrium, with anxiety at the præcordia, fits of dyspnœa, occasionally pain in the right shoulder, or in the chest, with a dry, teasing cough, headach, giddiness, sickness at stomach, sometimes vomiting, and great depression of spirits. The pulse is generally accelerated and irritable, especially towards night.

The appearance of the tongue is various in different stages of the disease, and in different cases: in the early stages it is generally white, excited, and



covered with a yellowish fur. As the disease advances, the tongue either becomes dry, clean, smooth, red, and lobulated, or excited, dry, and covered at the root particularly with a dark crust. The skin is sometimes dry, harsh and of a dirty appearance; occasionally it is covered with a greasy perspiration, and copious sweats often occur through the advanced periods of the disease. There are also frequent thirst, and great desire of cold fluids. In other respects, the progress of hepatic dysentery is much the same as the simple form of disease already described; but it presents, in general, a greater range or variety of phenomena in different cases, and even in the same case, in different stages of the malady." 209.

In the more chronic examples of hepatic dysentery, as connected with abscess, the matter not seldom finds its way into the alimentary canal, through adhesions previously formed—or perhaps through the ducts themselves.

"The symptoms of the chronic forms of hepatic dysentery are more mild: tormina and tenesmus are not severe, if at all complained of. Little or no pain is felt, even upon pressure, in the course of the colon; but the alvine evacuations are always more or less unnatural, and present appearances either of a morbid state of the bile, or of a deficient or obstructed secretion of this fluid. The calls to stool are also not so frequent as in the acute cases; but there are present great debility, depression of spirits, and sinking of the powers of life, particularly in those who have been addicted to intoxication.

In cases of hepatic dysentery, a dirty appearance of the skin, sallow cast of countenance, attended with an expression of anxiety and great depression of the spirits, are very generally present, and may often be relied upon as evincing disease of the liver, even although pain, weight, and tension at the epigastrium, præcordia, right thorax, and hypochondrium, may be wanting. The presence, however, of these latter signs, in addition to the former, and to the symptoms described as characterising the progress of simple dysentery, is distinctive of the associated disease of both organs." 211.

Under the head of Etiology, Mr. Annesley presents us with some documents indicative of the terrible ravages which dysentery occasions among European sojourners in tropical climates. Thus we find that, during a series of years, when the troops were not actively employed in the field, the annual rate of nominal admissions in hospitals (Bengal army) was 35 per cent. of the effective strength, while the annual rate of mortality was 5½ per cent. in the nominal admissions. In the Madras army the rate of mortality was 8 per cent. though the rate of admission was only 27 per cent. Malaria and atmospheric vicissitudes are looked upon, and, no doubt, with justice, by Mr. A. as the chief agents in the production of dysentery, with intemperance and some other causes as auxiliaries. We must pass over a great mass of observations on the etiology of dysentery, which might be useful in an elementary lecture on the subject, but would be misplaced here. They are deserving of attention among those who reside in the East, though few of them can have access to the work, on account of its price and size. We must now proceed to a subject interesting to all classes of our readers.

### POST-MORTEM APPEARANCES.

In those cases where the termination is rapidly fatal, sphacelation of the mucous membrane of the colon is generally observed, with portions of the same inflamed, or ulcerated. Without insisting that inflammation is the primary link in the morbid chain, Mr. Annesley maintains that it is a sine qua non in the complete establishment of the disease.

"It is extremely probable that the inflammatory action has been occasioned by some irritating cause lodged in the *primæ viæ*, inducing simple irritation, in the first instance, of the capillary vessels and exhalants of the mucous coat of the large bowels, or by other causes acting upon the body from without, and producing a determination of the circulating fluids to the same situation, and a similar condition of the vessels; but in whatever way it may originate, there can be no doubt that inflammatory action is, in the acute form of the disease especially, almost coeval with the dysenteric character of the stools; and the treatment which is founded upon this view will generally be the most successful in combating this disease as it is observed in warm climates. But whether dysentery originates in simple irritation, attended with increased exhalation, and terminating in acute inflammation of the mucous surface of the large bowels, or consists of inflammation of this surface from the commencement of the disease, is a question which cannot be solved by *post-mortem* examinations. Both these pathological states may be present in different cases, and may depend upon the causes producing the disease, and the constitution of the individual affected: from their nature they may be expected to produce analogous symptoms, and such as we observe generally to characterise the commencement of dysenteric affections.

Upon opening the abdomen of fatal dysenteric cases, the first object which generally attracts attention is the state of the omentum. This part is frequently inflamed, owing evidently to the extension of the inflammatory action to the peritoneal surface of the large bowels, and thence to this part. Sometimes it adheres, through the medium of coagulable lymph, to the more superficial convolutions of the bowels, at other times to the anterior part of the brim of the pelvis, or even to both: more frequently it is drawn up irregularly to the arch of the colon, and occasionally it seems wrapt close up to this part of the large bowel. Sometimes it is drawn to one side, and adheres both to the colon and to the abdominal parietes. These appearances are the more marked, if the ulcerations in the large bowels, which we shall have immediately to describe, have perforated the bowel, so as to occasion the extravasation of its contents into the peritoneal cavity, thereby producing general peritonitis; and when the dysentery has been complicated with hepatic disease.

With respect to the external appearances of the large bowels, it will be necessary to premise a few remarks before we proceed to describe the state of their internal surface. Sometimes these viscera present no external marks of disease to a superficial observation, and yet they will be found extensively disorganised when laid open. We suppose that it has been owing to their apparently healthy condition externally, that we so frequently have been furnished with accounts of a natural state of the large bowels having been observed in dissections of fatal cases of dysentery. The inference, to our minds, upon reading such accounts, is, that the individuals who furnished them have not inspected the seat of the disease which they had been attempting to investigate. Even when the colon is not remarkably diseased in its external surface, it generally presents one or more of the following states:—it is usually more or less distended with flatus. The colour of its surface is various in different cases, and the shade different in different parts of the same bowel. Upon grasping the viscus, and running the fingers along it, a different feeling is communicated to the touch in distinct parts of it: at one place it is thickened and doughy, in another, thin and membranous. In one part the general shade of colour externally is a bluish-grey; in another, a greenish-blue: in one case it is verging to purple; in another it is pink: sometimes it is obviously inflamed in its serous covering, the capillaries distended with blood, running in all directions, and forming a close reticulum in its surface; occasionally the colour of the surface is quite natural, and the peritoneal covering possessed of its natural diaphanous appearance.

The shades of colour presented by the cæcum and colon externally, although frequently depending upon, or having some relation to, the states of the internal coats of these viscera, yet sometimes have no such dependence: thus we have observed, in cases where the peritoneal surface was the most pale, the internal or mucous surface of the bowel was most deeply diseased, of the darkest colour, and either sphacelated or extensively ulcerated. In other cases, where this viscus was externally of the deepest colour, varying in some parts from a brick-red to a reddish-brown or deep purple, the internal surface has sometimes presented less than usual marks of disease in those situations. Hence, although the colour of the bowel externally may frequently depend upon the state of disorganization existing internally, yet no such connexion should be necessarily expected.



Displacements, elongations, and unnatural convolutions of the colon, are not infrequently observed in dissection of dysenteric cases. These have been already noticed; but we may further observe, that they are generally connected with some degree of relaxation of the longitudinal bundles of fibres which draw the colon into a sacculated form when in a state of contraction, so that the bowel in those states seldom presents many of those deep circular folds which form its cells; or they exist only in a small degree. In the majority of cases wherein displacements or elongations of the colon have been remarked by us, its peritoneal surface has been inflamed in parts, particularly that portion which was displaced. This is shewn in several of the Plates, where coagulable lymph may be seen covering the displaced portions, and connecting their surfaces either to each other or to adjoining parts, and sometimes to both. Amongst the most frequent displacements of the colon remarked, are,—first, a loop of the sigmoid flexure descending low into the pelvis, close to, sometimes adhering to, the urinary bladder and rectum, and explaining the disorder of the urinary function remarked through the progress of the disease; second, the descent of the transverse arch of the colon, generally towards the right side, nearly as low as the pubes, as represented in the Plates." 259.

Sometimes the cæcum and colon are distended with fetid flatus, and the caliber of the bowel every where increased. In many cases, however, the distentions are partial, and there are many constrictions. The constricted portions are sometimes very limited, and appear as if a ligature had been tied round the gut—in other cases they occupy a considerable extent.

"The constrictions in some cases seem to be chiefly the result of a spasmodic action of the circular fibres of the part affected, owing to the irritation and inflammation of the internal surface. In other cases they seem to be of a more permanent nature; although most probably at their commencement they were the consequence of spasm. When the parts contracted are also found externally inflamed, thickened, and hardened, and in a semi-cartilaginous state, as they frequently are in the more chronic cases, their nature cannot be mistaken; and they must be viewed as one of the results of a slower state of inflammatory action, or of acute inflammation terminating in the chronic form; they are also very often the effect of repeated attacks of the disease. Sometimes the constricted portions of the bowel are remarkably inflamed externally, and occasionally they present in the peritoneal surface no very evident appearance of inflammatory action; although, internally, both inflammation and its consequences are present to a great extent. The narrow constrictions, as if from a ligature, are those which least frequently offer an inflamed appearance externally.

When the constrictions tend nearly to efface the canal of the bowel, the part above is usually much distended, and in some cases the coats of the distended portion are lacerated, and the contents of the bowel effused into the peritoneal cavity. The laceration seldom takes place in a sound part of the bowel; it generally occurs, or at least commences, in a part which has been ulcerated internally, and softened by the existing inflammation. The laceration of the dis-

tended part of the bowel is mostly soon followed by the death of the patient, but seldom before evidences of general inflammation of the peritoneal surfaces have been produced by the effused matters, and the bowels are glued together by coagulable lymph; and albuminous exudations, with a turbid serum, are poured out into the abdominal cavity. Sometimes the lacerated portion of the bowel is situated below a constricted part. When this is the case, there is always found a still more constricted portion below the laceration, which is situated in a more or less distended part of the bowel; although, after the laceration has taken place, the extent of the previous distension cannot be ascertained. In addition to the contractions and constrictions of the colon, the parts thus diseased may be still farther deranged: they may be very closely adhering to adjoining viscera, or pressed upon by parts morbidly distended; or they may form very sharp turns and convolutions, tending still further to obstruct their canals; or they may be encumbered by large effusions of coagulable lymph upon their external surface, forming bands or artificial ligatures in the processes of condensation and adventitious organisation, which these effusions often experience when life is prolonged for any considerable time after they first take place. Similar appearances are also observed in respect of the distended parts of the bowels, as shewn by several of the Plates accompanying this Volume." 261.

When the inflammation of the mucous membrane has proceeded so far as to implicate the peritoneal covering, post-mortem examination discloses great vascularity of the latter tunic, sometimes amounting to a purplish hue, with agglutination of the adjoining surfaces, and of the intestines to the liver and other contiguous organs. We now revert back to the state of the internal surfaces.

"In almost all cases of ulceration of the large bowels, the parts ulcerated are softened or more friable, so that they are readily torn upon forcible extension; and if the parts situated between the ulcerations be inflamed, as they generally are, they are also lacerated with ease. Want of the cohesion characteristic of healthy textures seems to be generally present in nearly all instances of the disease accompanied with acute inflammation, or any of its consequences.

Besides the general appearances characteristic of inflammatory action, or resulting from this state, which we have now described, the coats of the large bowels seem much thickened. This is particularly observable in the subacute and chronic cases of the disease. A certain degree of tumefaction or fulness of the inner coats of these bowels seems to depend upon the inflammatory state, and to arise from the general injection of the vessels, and effusion of fluid in the cellular tissue connecting their various coats. A thickened condition of the large bowels is, however, not uniformly remarked: in some few cases their parietes seem thinner than they are even in the healthy state, and are, at the same time, ulcerated to a greater or less extent. Occasionally, one part of the viscus is evidently thinner than natural; whilst another portion is much thickened and as if corrugated, as in Plate XXXIV. fig. 1.

The colour of the internal surface of the large bowels varies very much in different cases, as well as in the same case. In some it is of a very deep red, streaked transversely, and dotted in parts with a darker tint; the edges of the deeper ulcers, and the centres of those in the incipient stages, being of a still darker colour. Sometimes, intervening between large portions of deeply inflamed and ulcerated colon, the mucous surface presents a pale, greenish-yellow hue, with or without small specks of ulceration, as in Plate XXXVIII. Occasionally, the intensely red colour is variegated by the different shades presented by the slight duplicatures and corrugations of the mucous surface of the bowel, and gradually passes into a yellowish or vermillion-red, and thence into a darker shade, indicating the transition to the sphacelated state, as shewn in Plate XXXIII. In some cases, nearly the whole of the mucous surface of the cæcum and colon is of a greenish hue, and presenting every depth of shade, from a pale grass-green to an olive colour; in some parts the deeper shades of green are interspersed with patches of a fine rose colour: in these latter the mucous tissue possesses its natural organisation, whilst, in the former, its cohesion and structure are entirely destroyed, and it is in all respects in the first stage of gangrene." 266.



Our author remarks that, in the complication of hepatic disease with dysentery, in hot climates, "the association of structural changes of the liver with disorganization of the large bowels is constantly observed." It would be very strange were it otherwise. Mr. A. admits, what had been inferred by writers long before him, that the vitiated secretions from the liver are probably a material agent in exciting inflammatory action in the intestines.

## TREATMENT OF DYSENTERY.

The rapid march of dysentery in hot climates requires rapid and active treatment; and in no disease is the utility of remedies, when early and judiciously employed, more conspicuous than in this disease. Unlike many maladies of temperate climates, dysentery is hardly capable of natural solution. On the contrary, it naturally tends to disorganization, if neglected.

The first indication, in uncomplicated dysentery, is to empty the bowels, and the second to guard against inflammation. The other indications are considered as subordinate.

"If the patient comes under our care when the premonitory symptoms of disorder are present,—when the bowels are first disordered, and he complains of chills, followed by slight flushes, coldness of the back and loins, &c.,—the exhibition of an ipecacuanha emetic, followed in a few hours by twenty grains of calomel, and this in two or three hours more by a purging draught and an enema, is often of the greatest benefit. At this time also the warm bath is of great service, by determining the circulation to the external surface of the body and taking off spasm, whilst the evacuating remedies directed to the *primæ viæ* unload it of those accumulations which are so frequently instrumental in producing the disease.

When acute dysentery is fully developed, and the patient complains of a sense of heat, burning, soreness, pain, tormina, &c. then depletion is absolutely requisite, and the sooner it is employed after the supervention of those symptoms, the more likely is advantage to be procured from it. The above symptoms are sufficient of themselves to require its adoption, if the pulse be but little accelerated and the patient not plethoric; and if he have been resident for a considerable time in the climate, local depletions, followed by hot fomentations or warm poulticing, when the leech-bites have ceased to bleed, will generally be sufficient. Depletion to a great extent, or at least to a sufficient extent, may be practised in this way. But if the patient has recently arrived from Europe, if he be of a full habit, if the pulse be full, hard, and irritable, if the tormina be violent, and pain fixed and increased on pressure,—a full blood-letting from the arm should always precede the application of leeches to the abdomen." 273.

The repetitions of bloodletting must depend on the judgment of the practitioner. In addition to depletion, general or local, Mr. A. endeavours to procure free evacuations from the bowels. "With this view, 20 grains of calomel, combined with one or two of opium, should follow the first depletion, and, a few hours afterwards, a purging draught, assisted by an in-

jection, should be administered. The previous exhibition of the calomel and opium allays the irritability of the stomach, if this symptom be present, removes spasm, and prepares the morbid secretions of the liver and bowels for removal by means of the purgatives which are to follow." By the above passage, it will be seen that the plan laid down twenty or thirty years ago by writers on tropical climates, and by the Editor of this Journal in particular, continues to be the standard practice up to this hour. The above plan is almost verbatim et literatim what was acted on during the late war in India, and with the best success. We do not quite agree with Mr. Annesley, however, in his inveterate desire for purgation in dysentery; because we are very far from believing that the retention of fæcal matters in the cells of the colon constitutes the sole, or even the principal cause of the tormina and other phenomena of dysentery. Nevertheless, the plan pursued by our author will be generally successful; because the exhibition of the calomel and opium previously to the purgative, corrects any bad effects that might result from the purgative plan if pursued by itself. Tepid and warm bathing, after the antiphlogistic measures, is an important auxiliary—as are blisters and local fomentations to the abdomen.

"In the far advanced stage of the disease, after the above measures have been employed without deriving from them those advantages which they are calculated to afford, and generally do afford; or when the patient has been neglected or injudiciously treated at the commencement of the malady, the existence of ulceration of the large bowels, either in its incipient or farther-advanced stages, should be dreaded; but we ought not on that account entirely to despair of the recovery of the patient, although an unfavourable termination is more likely to supervene. We have known many cases of recovery wherein the symptoms clearly indicated the existence of ulceration; and even after large portions of the mucous surface of the large bowel had been detached and evacuated with the discharges. Until unequivocal signs of approaching dissolution are present, our means of cure should be administered zealously and unremittingly, and be judiciously selected and applied, according to the symptoms which may supervene.

At this period of disorder, the warm bath; blisters over the abdomen; emollient, mucilaginous, and anodyne enemata; small and frequently repeated doses of Dover's powder; injections of the infusion of ipecacuanha with opium, or of a weak infusion of bark and rhubarb; warm poultices over the abdomen; the use of the diaphoretic mixture already noticed; the infusion of catechu given internally or as an enema; and camphor, with ipecacuanha and opium, are often very serviceable. When there is evidence of morbid secretions and fæcal matters still remaining at this stage of the disease, a full dose of calomel and opium may be given at bed-time, in addition to the employment of some of the above remedies, and followed early in the morning either by a full dose of the compound jalap powder taken in aromatic water, or of rhubarb and calcined magnesia. If either of those seem not to answer the purpose intended, a full dose of castor oil may be substituted for them." 283.

The treatment of hepatic dysentery does not differ, in any material point, from that which has been detailed above. There will be more need, however, of impregnating the system with mercury than in the simpler forms, in order to remove the hepatic disease. Upon the subordinate means of relieving particular symptoms in dysentery we need not dwell, as they naturally suggest themselves to every well-informed practitioner.



## XII.

**TREATISE ON THE EXCISION OF DISEASED JOINTS.** By *James Syme*, Esq. F.R.S.E., Surgeon of the Edinburgh Surgical Hospital, Lecturer on Surgery, &c. &c. 8vo. pp. 163. Edinburgh, Adam Black, 1831.

THOSE who have paid attention to the progress of modern surgery, will acknowledge that its advance has been by two different paths: in the performance of operations formerly unheard of, or considered impracticable; and, in the non-performance of operations formerly of very frequent occurrence. Limbs were amputated for diseases some twenty or thirty years ago, which are commonly curable without amputation now, and we think that this constitutes the truest, though the least obtrusive, glory of our science. The proper object of medicine and surgery is the alleviation of human woe, and this we conceive is better attained by dispensing, if possible, with the knife altogether, than by using it with the most consummate dexterity and success. Amputations have always been regarded with some feelings of disgust; it is a humiliating as well as a painful spectacle to see a limb lopped off for disease; it is, as has been justly remarked, a confession of our inability to cure, of the incapacity of our science. Any proposal, then, intended to mitigate the severity of this mutilation, should be candidly received and carefully examined. Undoubtedly its merits should not be blindly and hastily admitted, but neither should they be dogmatically nor obstinately denied. It is a pleasant and besetting sin in human nature, to refer the *cause* of all innovations to the arbitrary decisions of prejudice and habit.

For many years past a few surgeons have been successively struggling to drag into notice excision of some joints as a substitute on some occasions for amputation. As yet they have scarcely succeeded, but latterly the publication of cases in the medical journals has drawn a considerable degree of attention to the subject. Our readers need scarcely be told that Mr. Syme has rather distinguished himself in this department; that, in fact, he has become the Coryphæus of the excising party in this country. He has previously given to the world detached papers and cases in reference to the question, and now he steps forward in the dignified garb of an octavo. As we believe that the surgical part of the profession are beginning to direct their serious attention to the advantages or otherwise of excision, we cannot do better than lay the substance of the work before them. As usual we shall analyze.

The first chapter which treats of the diseases of joints is not worth notice, but the second, in which are discussed the relative merits of excision and amputation, must give us pause. The following are our author's remarks on excision.

"The great recommendation of excision is, that it saves the patient's limb; and the benefits accruing to him from this are so important and conspicuous, that, unless the objections which can be urged against it should appear after mature consideration to be very serious indeed, we ought not to hesitate in giving it the preference. These objections, so far as I have been able to ascertain,

are the following:—*First*, The difficulty of the operation. *Second*, Its danger. *Third*, The useless condition of the limb in which it has been performed.

In taking into consideration the difficulty of the operation, it must be ascertained, in the first place, what is requisite to constitute its effectual performance: in other words, how far it is necessary to take away the diseased integuments, synovial membrane, articulating cartilage, and extremities of the bones. In cases of old standing, where the sinuses are numerous and the suppuration has been profuse, the integuments surrounding the joint often retain hardly any trace of their original appearance or structure. They lose their laxity and mobility, from effusion of lymph into the subjacent cellular substance; become smooth and shining on the surface, which is often of a dark-red or purple colour; and are so soft, that, if stitches are introduced to approximate the edges of an incision made in them, the threads instantly cut their way out. It might, therefore, be supposed that no healthy union or permanent cure could be obtained if parts in such a morbid state were allowed to remain, and that, consequently, the operation could very seldom be practised with propriety. Experience, however, has shown that this is not the case; and that in a very few days after the operation, when the swelling and inflammation immediately consequent upon it begin to subside, the diseased integuments regain their natural characters, and ultimately become perfectly sound.

As to the synovial membrane, Mr. Brodie has stated his opinion, that, when once its structure has been completely altered, it cannot be restored.* Independently of his high authority, it might be readily believed, that, if any of the thick gelatinous substance into which this membrane is transformed were permitted to remain, a cure could hardly be accomplished; and that, as this portion of the articular apparatus is not only very extensive, but likewise most intimately connected with the surrounding tissues, it must consequently be next to impossible to perform the operation of excision effectually. Experience here also, however, has decided the matter to be otherwise; and it is proved beyond dispute, by the facts hereafter to be mentioned, that the synovial membrane, though thickened and gelatinized to the utmost, affords very little obstacle to recovery, since it speedily disappears, partly by sloughing, but chiefly through the absorbent action of its own vessels, during the copious suppuration which ensues.

With regard to the cartilage, it might be expected that no harm could result from leaving any part of it that remained sound; but here, too, the judgment of theory is reversed by experience, since it has been found, that, when any portion of the articulating surface was left, the disease required a subsequent operation. The cause of this is probably to be referred, not so much to any morbid process in the cartilage itself, as in the synovial membrane lining it, and in the spongy bone immediately subjacent, which has its tendency to morbid action excited by the injury sustained in its neighbourhood. The operation, therefore, essentially requires the removal of the whole cartilaginous surface.

Lastly, as to the bone, one not acquainted with the pathology of the osseous tissue, who examined the bones of carious joints after maceration, might be apt to suppose that the diseased part could not be removed without sacrificing so large a portion of the whole, as to render it useless and unworthy of preservation. Plate I. Fig. 1, will illustrate this. The bones represented here are those of an elbow-joint, which I amputated before adopting the plan of treatment now under consideration. It will be observed that they are much increased in thickness to a considerable distance from the articulation, and that their surface in the whole of this extent is covered with irregular warty excrescences, which give it a rough tubercular appearance. When these tubercles are examined more particularly, they are found to consist of a compact osseous substance, which is smooth on the surface, and perforated with numerous apertures for the transmission of blood-vessels. This is new bone, and perfectly healthy in its actions; it resembles in all respects the callus, or new osseous substance, which effects the reparation of fractures, and is thrown out in consequence of the irritation of the disease. The truly morbid or carious portion of the bone is seen between the lines AA and BB, occupying merely the articulating surfaces. The external shell of the spongy bone is here removed by the disease, and the cancelli are exposed to view, presenting a rough surface composed of rigid plates and spiculæ, which are white and more brittle than usual, so as to seem as if they had been subjected to the action of fire. The depth to which the bone is thus affected varies considerably, according to the origin of the disease. When the morbid action commences in the synovial membrane or cartilage, it is generally superficial; but when the inflammation is primarily seated in the substance of the spongy bone, as in the third kind of white-swelling which has been mentioned, then, as has been already stated, the substance of the bone is more deeply affected, being often excavated into a hollow, which is carious over the whole of its surface. The extent of this cavity seldom, or rather never, exceeds the bounds of the epiphyses, except sometimes in young subjects, where the bone has been widely altered by scrofulous action, previous to suffering the inflammation which more immediately occasions the caries. From not distinguishing between the truly diseased bone and that effused in consequence of its irritation, it appears that a much larger portion has been taken away in some of the cases of excision hitherto published than there was any occasion for. Less than a half of the portions of the humerus and femur which were removed by Moreau and Crampton, I should certainly think, so far as can be judged from the evidence of their drawings, would have been sufficient for the purpose, in which case it is plain the limbs would have been much less shortened and weakened, and the magnitude and consequent severity of the operation diminished. As already stated, the caries seldom goes beyond the epiphyses, which are all the part of the bone that the surgeon requires to remove, except in the rare cases where the bone is found to be more extensively affected; and in these it will probably be most prudent to perform amputation." 22.

* Vid. Op. et loc. cit.



From this analysis Mr. Syme comes to the conclusion, that all essentially required in the operation is the removal of the articulating epiphyses. With regard to the means of performing it, Mr. S. gives the preference to Mr. Liston's cutting pliers, whenever the ordinary saw is not applicable. The difficulties of the operation are certainly sometimes considerable; but they are such as can be surmounted by a moderate share of dexterity and coolness. The danger of excising a diseased joint is, for obvious reasons, not to be compared with that of opening into a sound one. Patients have been observed to sleep better the night after the operation than for a long time previously. From a consideration of all the circumstances Mr. S. thinks it not unreasonable to conclude that the danger from amputation is greater than from excision, and this conclusion appears to be borne out by facts. Mr. S. has cut out fourteen elbow-joints, and the operation has been performed in Edinburgh three times by other practitioners. Of these seventeen cases two only have terminated fatally, and in one Mr. Syme believes that the patient would have died from any operation, while in the other the disease was found so extensive as to render the excision almost impracticable. He believes that the result of seventeen amputations in similarly unfavourable constitutions would not be so satisfactory. Here we cannot refrain from remarking that the operation of excision appears to be too frequently performed in Edinburgh. At a large hospital in London we have not wit-

nessed seventeen amputations for diseased elbow in the course of many years, and yet we need hardly say that great numbers of such cases have been treated at the institution. The majority of patients thus affected have done well without any operation. They have had more or less anchylosis it is true, but still we presume that the warmest advocates for excision will scarcely prefer its risks and consequences to anchylosis without an operation at all. We cannot but suspect that joints are excised by Mr. Syme and others, which might be saved by time and perseverance.

The last point to be considered is the subsequent state of the limb. Experience has proved that true anchylosis or osseous union does not even frequently occur, indeed not without very great attention on the part of both the surgeon and patient, and particularly not without absolute rest. When no such precautions are employed, the union is by means of a tough, flexible, ligamentous-like substance, that permits the bones to be used with more or less freedom, according to the exercise which they are made to undergo during the process of healing. The voluntary motion, at first impaired or altogether lost, gradually returns, and ultimately becomes as strong as ever. Mr. Syme winds up by asserting, that the cases to be related will prove that it is possible to save limbs by excision of diseased joints nearly, if not altogether, as useful as before they suffered from disease.

### METHOD OF PERFORMING EXCISION OF THE JOINTS.

The precepts given by Mr. Syme are these:—Let the patient be placed in the position which most readily exposes the articulation, and is preserved with least difficulty. A tourniquet is seldom necessary. The most convenient scalpel is a long, narrow one, straight in the back, very slightly convex in the edge, stoutly made, having a small part of the back ground off obliquely at the point, so as to render it less apt to be broken, and to bring it to correspond with the axis of the handle. The preliminary incisions should be free; in making them, the knife should be thrust at once into the joint, and afterwards carried close down to the bones, which shortens the operation, lessens pain, and renders the line of incision more determined in its direction. The muscular and tendinous parts should be as little injured as possible, and the most effectual method of saving them is to cut them close away from their attachment. The saw may be either a simple blade, or the one in common use for amputation, which Mr. S. believes to be the most convenient. He finds the hand the most effectual guard for the defence of the soft parts; and, instead of cutting the bone completely through with the saw, it is often better to divide it only partially with that instrument, and then resort to the cutting pliers, which readily detach the fragment as soon as there is a groove formed for the reception of their blades. Unless the bone is very large and hard, the pliers are of themselves sufficient for the purpose. The flat sides of the blades should be turned towards that surface of the bone which is to remain, as it will thus be less apt to be splintered or irregular.

"When all the diseased bone has been got away, which will be learned by a careful examination of the separated fragments and the remaining surface, if there are any large masses of gelatinous substance which can be easily detached, it is as well to remove them, since, though they would not afford any great obstacle to recovery, they might have some effect in retarding it, and also preventing the edges of the wound from coming readily together. Though the hemorrhage is generally pretty free in the first instance, it seldom persists so as to require the application of ligatures. The general oozing from the surface is usually soon checked by exposure to the air, or washing with cold water; but if, after the operation is ended, one or more arteries should continue to throw out a jet, they ought to be secured, as it is next to impossible to exert pressure with any effect, and considerable inconvenience is apt to result from the cavity becoming distended with blood. The vessels that prove obstinate are generally situated in the indurated subcutaneous cellular tissue, and require considerable care both for their discovery and ligature.



The next part of the process is to place the edges of the wound in contact, and retain them together, which is best effected by the interrupted suture, unless the integuments should be so very soft as to give way under the pressure of the threads, in which case compresses of lint must be used in their stead. It is always of most consequence to unite the edges of the transverse incision, if there is one, since, if they do not heal by the first intention, they are afterwards brought together with very great difficulty, and the broad cicatrix which results from their separation is very adverse to the mobility of the joint. Some compresses of lint ought to be applied over the flaps, and then the limb being placed in a proper position, that, namely, in which it will most frequently be required after the cure is completed, it ought to be enveloped with a long roller, which affords the requisite support much better than splints or rigid cases of tin or pasteboard.

The constitutional disturbance, for the reasons already stated, is usually very slight, and requires nothing more than some gentle purgative or slight antimonial, with spare diet and rest. The pain is usually severe for the first five or six hours, but then subsides, and seldom proves troublesome afterwards. The dressings ought to be changed ten or twelve hours after the operation, by which time the oozing of blood and serum will be at an end; and then also any inequality or gaping of the edges may be rectified by slips of sticking-plaster. Union by the first intention sometimes takes place through nearly the whole line of incision, except where old sinuses exist in its course; more frequently the adhesion is only partial, and the wound opens out more or less widely, according to the degree of local inflammation, and the distention caused by blood contained within its cavity. In the course of a few days, the discharge, which was at first copious and offensive, begins to diminish; all the clots of blood issue from the wound; the swelling subsides; and the favourable change is altogether so sudden and satisfactory, as to surprise those who are not accustomed to witness the operation.

During the cure every means is to be employed either to keep the limb perfectly quiet, to favour anchylosis, or to exercise it in the degree and extent of mobility which will be required of it. The wound is generally very nearly healed in the course of a few weeks, but one or more sinuses continue to discharge for months, or even a year or two. Small portions of bone also occasionally come away; but if the surgeon has done his duty in the first instance, he need not be under any apprehension on these accounts; and the patient will be too well pleased with being freed from the pain of his disease, and having regained the use of his limb, to feel annoyed by the trifling inconvenience which he thus experiences." 37.

### EXCISION OF THE SHOULDER-JOINT.

Having noticed the preceding part of the volume, which treats of excision of joints generally, we shall endeavour to be brief with the suc-

ceeding portion, which is devoted to the consideration of the particular articulations. We are induced to do this because much has already been published on the subject, and those who wish for very particular information may readily refer to Mr. Syme's book, his former papers, or to the article on Excision of Joints in the Surgical Dictionary.

The humerus is not always affected to the same extent, but all that part above the attachments of the pectoralis major and latissimus dorsi should be taken away, and that in the first instance, to afford room for getting access to the scapular part of the disease. The acromion sometimes participates in the disease, and then requires removal. By opening the articulation at its external or lateral part, and then cutting close to the bones the axillary artery is perfectly safe. The only vessel requiring a ligature is the posterior circumflex artery.

The best way of bringing the bones completely within reach, with least injury to the soft parts, is to make a perpendicular incision from the acromion through the middle of the deltoid, nearly to its attachment, and then another shorter one upwards and backwards, from the lower extremity of the former, so as to divide the external part of the muscle. The flap being dissected off, the joint will be brought into view, and the capsular ligament, if still remaining, having been divided, the finger may be passed round the head of the bone, so as to feel the attachments of the spinati and subscapular muscles, which can then be readily divided by introducing the scalpel, first on one side and then upon the other. The elbow then being pulled across the fore-part of the chest, the head of the humerus will be protruded, and can be easily sawed off whilst grasped in the operator's left hand. The subsequent part of the operation is to be conducted on the principles already laid down. As the preservation of as much mobility as possible is desirable, motion should be restrained no further than is necessary to prevent irritation and displacement. The tendency of the pectoralis major and latissimus dorsi to draw the extremity of the bone inwards may be easily prevented by placing a cushion in the axilla. Two cases are detailed; we shall shortly notice the first.

*Case.* Christian Laing, æt. 38, applied to Mr. Syme in June, 1825. She complained much of pain in the left shoulder, shooting down the arm to the fingers—the articulation was nearly immoveable, and the limb entirely useless, being constantly kept in a sling. There was a small opening directly under the acromion, and another about the middle of the clavicular part of the pectoralis major, both of which allowed the probe to pass deeply in the direction of the joint. The discharge was thin and copious, the integuments natural, and there was little swelling. She was a healthy-looking woman, apparently somewhat exhausted by anxiety and suffering. The disease had commenced six years previously after a fall upon the shoulder. For five years after the injury she suffered only pain and stiffness, but then, after some rough usage, an abscess formed on the fore-part of the joint, and, still more recently another. Mr. S. merely dilated the sinuses and sent the patient into the country. In the following March she returned, much thinner and weaker than before, with another sinus just above the posterior margin of the axilla, an almost incessant gnawing pain, little appetite, and an exhausting diarrhœa. Nothing but an operation promising relief, Mr.



Syme proposed to cut down upon the joint, and excise the bone or amputate the limb according to circumstances. His mode of operation having been already described, we need not go into the details in this place. The head of the humerus being hollowed into a cavity was removed; the glenoid cavity seemed sound, though divested of its cartilage; but the extremity of the acromion was bare and rough, and was cut away with the cutting-pliers. The operation occupied ten minutes. An attack of erysipelas followed the operation, but in a few weeks the wound was healed, except at those parts which corresponded with the openings of the previous sinuses. The use of the limb returned gradually, and by degrees the sinuses dried up, though one of them continued to afford a few drops of serous exudation for two years. She is now, four years and a half after the operation, in the following state. She is stout, active, and young-looking; manages her domestic concerns as a tradesman's wife; sews, knits and washes; and can carry a full pitcher of water with the left arm. There is no discharge or uneasiness of any sort. The left arm is about an inch shorter than the right. The shoulder, when examined bare, exhibits a deep, irregular, unseemly cicatrix. The joint allows the limb to be moved in all directions to nearly the natural extent, but the voluntary command over it is much more limited. She can move it across the chest, both backwards and forwards, with considerable force and freedom, but she has very little power of abduction.

In the other case of excision of the head of the humerus, there were symptoms of affection of the lungs before the performance of the operation, and the man died of phthisis six months after it.

### EXCISION OF THE ELBOW-JOINT.

This is much more difficult, from the anatomical characters of the parts, than excision of the head of the humerus. The operation may be required either for caries, or for the effects of external injury both primary and secondary. The part that usually suffers most from caries is the olecranon, which is not unfrequently hollowed into a cavity, and diseased throughout; the radius and humerus are in general affected but superficially, and the disease very seldom extends beyond the head of the former and tuberosities of the latter. It is always right to take away the whole of the sigmoid cavity of the ulna, comprehending the olecranon and coronoid processes, together with the head of the radius and extremity of the humerus, as high as its tuberosities. The removal of more would be unnecessary, of less useless.

"The easiest way of accomplishing this is to remove the olecranon in the first place; then to cut the lateral ligaments of the joint, so as to free the extremity of the humerus, and saw it off; lastly, to detach, by means of cutting-pliers, the head of the radius, and the remaining part of the sigmoid cavity. The reason for not separating at once the whole of the ulna that requires to be removed is, that, in case it is divided below the insertion of the *brachiæus internus*, its removal becomes extremely difficult. Having experienced this inconvenience in one of my first cases, I have since always proceeded as has just been described, and never found any difficulty in detaching the coronoid process after gaining the free space that was afforded by removing the olecranon.

A simple longitudinal incision will not give sufficient access to the joint to allow of its excision, even in a sound state of the parts, much less when they

are thickened and preternaturally adherent, as in cases of caries. An additional transverse cut was therefore proposed by Mr. Park, intersecting the other at right angles; but this plan labours under the double objection of splitting the triceps, and not permitting free exposure of the humerus. A method still more objectionable, on the ground of unnecessarily injuring the muscles, is to make a longitudinal incision, and two transverse ones at its extremities, so as to form two lateral flaps. By far the best plan that has yet been contrived is that of Moreau; and though it may appear at first sight complicated and destructive to the soft parts, it is really the easiest and least injurious that can be imagined. The figure H gives a perfect idea of his incisions; and it is only necessary to state further in explanation of them, that the transverse one should be close above the olecranon. In making this cut the ulnar nerve is apt to be wounded or divided; and though the facts mentioned below make this injury appear of very little consequence, as there can be no advantage in inflicting it, the surgeon ought to use the precaution of ascertaining the situation of the nerve before introducing his knife. The thickening of the limb is sometimes not so great as to prevent the nerve from being felt, but more frequently its situation can be discovered only by recollecting its position relatively to the bones; it lies close to the inner edge of the olecranon, and will certainly be cut if the transverse incision is prolonged farther than this towards the internal tuberosity of the humerus. The surgeon, therefore, ought to feel for the olecranon, and introduce his knife close to its upper surface, with the back turned towards its inner margin, but somewhat nearer its radial side. Having thrust the knife down into the joint, he ought to cut transversely, with a sawing motion, so as to insure the division of the tough tendinous parts, until he arrives at the radial tuberosity of the humerus. He may then make the longitudinal incisions, which should extend about an inch and a half upwards and downwards, without any danger whatever, as the oblique course of the nerve recedes from the line of division. Both flaps should be dissected previously to commencing the excision of the bones, as it is thus rendered much easier than when the exposure is confined to the part that is to be first removed. The hemorrhage is generally profuse immediately on the incisions being made, but soon diminishes, and seldom persists to such extent as to require the application of a ligature; on the principle already stated, however, it is right to secure any vessel, however small, that threatens to continue to bleed. In those rare and perplexing cases, where the ulna is diseased below the coronoid process, and requires to be divided through its shaft, the interosseous artery is very apt to be divided, and must, of course, be tied. As to the humeral artery, it is always perfectly safe, being protected from injury by the whole thickness of the *brachialis internus*." 70.

There is great variety in the difficulty experienced in different cases, owing to the nature of the adhesions, &c. After the operation the edges of the wound should be stitched together, the limb should be half bent, and a long roller applied in the figure of eight to give it proper support. The best position for the patient in cutting out the elbow, is lying with his face downwards on a sofa or table covered with a mattress.

Thirteen cases of excision of the elbow-joint are detailed. As many, if not most of them, have been formerly published in other journals, and some have been noticed on different occasions in this, we shall waive their consideration in the present place. We pass to—

### EXCISION OF THE WRIST-JOINT.

The construction of this joint, with its many bones and the numerous vessels and tendons in its vicinity, would seem to forbid, or, at all events,



furnish strong arguments against excision. Mr. Syme has never performed the operation, but, if circumstances should render it advisable he would proceed in the following manner. Two longitudinal incisions, about an inch and a half in length, should be made from the extremities of the radius and ulna upwards along the lateral aspects of these bones. Then two shorter cuts are to be carried inwards on the posterior surface of the wrist, from the lower ends of the former ones. The extensors of the thumb will be divided, and the radial artery must be carefully avoided. The bones, being exposed as well as possible, should be divided with the pliers as high as necessary, when their removal will be easily accomplished, after which the carpal part of the articulation may be readily cut away with the pliers and gouge. It is said that Moreau, jun. and Roux have performed this operation with success.

In caries of the carpal bones, it is hardly prudent to attempt excision unless the disease is stationary, of limited extent, and without thickening in the neighbourhood. In operating, the surgeon should give himself plenty of room by a free crucial incision, and having exposed the bone by raising the flaps he may remove, with the gouge and pliers, the carious portion, which he recognizes by its softness. When the first joint of the fingers or thumb is affected, amputation is preferable to excision, as the shrunk and powerless digit is only an annoyance to the patient.

### EXCISION OF THE HIP-JOINT.

Reasoning would lead to the supposition that excision is not so applicable to the articulations of the lower extremities as to those of the upper. But we yet want sufficient facts to set the question entirely at rest. Excision of the hip-joint, for disease, has been proposed. Mr. Syme thinks that the almost invariable implication of the acetabulum in the ulcerative process is a sufficient bar to such an operation. Sometimes obstinate sinuses about the hip are owing to exfoliation of the bones of the pelvis, and the removal of the diseased portion is followed by a cure. Where the head of the thigh-bone has been shattered by a musket-bullet, without extensive injury of the soft parts, extraction of the fragments would be preferable to amputation. In trials on the dead subject, a single perpendicular incision, five or six inches long, commencing a little above the trochanter major, has been found to afford sufficient room for cutting out the head of the bone, where the parts are sound and free from morbid adhesion.

### EXCISION OF THE KNEE-JOINT.

"The objections to excision of the knee-joint seem at first very great, and indeed insurmountable. It may be sufficient to mention the severity and danger of the operation, the tediousness of the cure, and the little difference as to utility between the stiff limb that is preserved and an artificial one. Upon closer examination, these objections, though they do not altogether vanish, certainly appear of less force. Thus the operation requires comparatively small superficial incisions, and can be accomplished much more quickly and easily than excision of the elbow-joint. It certainly must be regarded as more dangerous than amputation when the patient is very weak or exhausted by previous disease; but if he possesses moderate strength, I think it cannot be maintained, either on the

general principles already stated, or from the result of experience, that the risk attending it is more than what proceeds from removing the limb. The recovery was certainly very tedious in Mr. Park's case, but there were particular circumstances which in some measure account for this; and the few patients who have since then undergone the operation recovered in a shorter time. It ought here to be recollected, too, that though recovery from amputation of the thigh is usually completed in three or four weeks, it is generally *at least as many months* before the patient can rest the weight of his body on the face of the stump, so as to use it in standing or walking. As to the utility of the limb, we find that it can be employed freely in progressive motion, and all the patients have declared that they consider themselves extremely fortunate in having preserved their legs such as they were. The advantages of the operation which may be contended for, are, that it preserves the natural support of the body afforded by the bones and joints of the *tarsus*, *metatarsus*, and toes, which, by diffusing the effects of force applied at the extremity of the limb, protects both it and the other parts of the body from concussion; and that it obviates the necessity of resting the whole of the patient's weight on the *face* of a stump, which must be done when amputation is performed above the knee. On the whole, I am not inclined to condemn the excision of the knee-joint altogether; and at the same time cannot venture to recommend it, without more facts to ascertain the correctness of our hypothetical opinions on the subject." 132.

Mr. Syme's plan of operating is to make two semilunar incisions across the fore-part of the joint, extending from one lateral ligament to the other, meeting at their extremities, and including the patella between them. If more room is required it may be obtained by cutting longitudinally at the point of union of the transverse incisions. The patient being laid on his back, the cavity of the joint should be rapidly opened and the patella removed. The lateral ligaments being next cut, the extremity of the femur may readily be protruded, and as much as seems necessary sawed off. The diseased part of the tibia can be easily taken away by passing the knife round the head of the bone, so as to detach its connexions, and then sawing off a slice of the requisite thickness. The popliteal vessels are little endangered; one or two of the articular branches may require to be tied. Great difficulty has been experienced in bringing the limb into a straight position after the operation, owing to the contracted state of the flexor muscles. The surgeon must be satisfied with placing the limb on a double-inclined plane, in as good a position as can be obtained by moderate force, exerted by pasteboard splints. In a few days the tension gradually diminishes, and before long the leg can be completely straightened. During the cure a slight degree of motion ought to be allowed, in order to prevent perfect osseous union. The chief difficulty consists in preventing the tendency to bend outwards, the best mode of opposing which consists in the careful application of splints. Two cases of excision of the knee-joint are detailed. We shall notice them succinctly.

In the first case, that of a boy aged 8, the disease had existed three years, there were sinuses, the joint was much enlarged, and bent at an acute angle. The health was broken. The operation was performed on the 7th December. There was much difficulty encountered in consequence of the contraction of the ham-string tendons, and after the operation there was a great tendency to the tibia being drawn up behind the femur. At the end of some days this was counteracted, the limb became quite straight, and all did well. In four weeks after the operation, the wound was nearly healed, in three months it had regained so much strength that the patient could make some use of it in walking. At present he can walk and run, though with a halt, and merely requires the *heel* of the shoe to be two inches higher than the other. The limb is stout, slightly bowed outwards, and allows a slight degree of flexion and extension.



In the second case the operation was performed on the 14th December, and the boy died on the 8th of January.

### EXCISION OF THE ANKLE-JOINT.

The following observations on this operation are characterized by fairness and judgment.

"Next to the knee-joint the ankle is the most common seat of white-swelling, and the practicability of its excision is therefore an important subject of inquiry. It might be thought that the same objections would apply here as to the wrist-joint, but they hardly do so, at least to an equal extent. Instead of the three carpal bones which are connected with the radius and ulna, there is only one of the tarsus united with the tibia and fibula, viz. the astragalus, and it is of so large a size that the articular surface may be removed without encroaching on its connexions with the other tarsal bones; while in the wrist it is impossible to take away any portion of the carpal part of the articulation without opening other joints, and thus laying the foundation of future disease by exciting inflammation in a structure predisposed to unhealthy action. In the ankle, too, the tendons are less numerous, and the bones are of a larger size, so that more room can be obtained for their removal. But though excision of the ankle may thus be not so objectionable as that of the wrist, it cannot boast of much advantage. The object to be gained being merely a support for the body, it may be questioned how far the foot that remains after the ankle-joint has been cut out is superior for this purpose to an artificial one. It appears from the experience of Moreau, that anchylosis is very apt to ensue after the operation; and though, as he observes, the other joints acquire an unusual degree of mobility, so as to compensate in some measure for the rigidity which is thus caused, there can be no doubt that the elasticity of the foot will be greatly impaired. The limb, too, must be considerably shortened, and the ankle little calculated for bearing the severe strains to which it is exposed. It may be proper to notice also, that a very large proportion of the diseases usually referred to the ankle-joint are seated in the articulation between the astragalus and *os calcis*." 141.

Moreau's mode of operating appears to Mr. Syme to be the best. Two incisions, three inches in length, or more, are to be made along the posterior edges of the tibia and fibula, from their inferior extremities upwards; then from the lower ends of these two transverse cuts, in a direction forwards, as far as the tendon of the tibialis anticus on the tibial side, and to that of the peronæus tertius on the fibular side. The flaps being raised, the bones of the leg are exposed, and may be divided by the saw or pliers as high as necessary, after which the separation of their ligamentous connexions is easily effected. The articular surface of the astragalus may lastly be readily removed by the gouge or cutting pliers. The limb should be gently moved during the cure, to effect a firm fibrous union rather than an osseous one.

### CARIES OF THE TARSUS AND METATARSUS.

Attempts have been made to cut out the tarsal and heads of the metatarsal bones when carious. Unless the disease is confined to the os calcis,

and removable without opening into the tarsal articulations, Mr. S. believes that the practice will be unsatisfactory. When the os calcis alone is affected the disease may be extirpated by making a crucial incision on the fibular side, and then digging out the carious part with a gouge.

" If the disease extends to any of the other tarsal or metatarsal bones, there is hardly any remedy but amputation; and if either the *astragalus* or *os calcis* be affected, of course the whole foot must be removed. It will be well, however, to recollect in such cases, that it is neither necessary nor useful to take away so much of the leg as is usually done. If the amputation is performed in a proper manner at or below the middle, so that a good cushion of muscle and integument is left to protect the extremities of the bones, the patient will retain the use of his knee-joint, and be able to stand or walk with an artificial foot, or short wooden pin, much more conveniently than he could do if obliged to support himself by resting on the knee. As the half of the leg is sufficient for this purpose, the surgeon should not amputate lower than this, since, though it may sometimes be possible to obtain a good stump by doing so, it much more frequently happens that, from the soft parts being too scanty in proportion to the size of the bones, these are badly covered." 144.

When both the os calcis and astragalus are sound, it is practicable to save an useful part of the foot by partial amputation.

### PARTIAL AMPUTATION OF THE FOOT.

According to Mr. Syme's observations, the principal parts of the foot liable to be affected by caries are three;—the articulation between the bones of the leg and the astragalus—the articulation between the astragalus and os calcis—the further range of tarsal bones and neighbouring heads of the metatarsal. Here the disease is completely within reach of an amputation, such as Chopart's, which leaves only the os calcis and astragalus. Mr. Syme considers and meets the objections which have been urged against the operation, but we may omit his arguments, and content ourselves with shewing his method of operating.

" When the operation is to be performed, a tourniquet ought to be applied; and as it is always proper to compress vessels as near as possible to the part where they are to be divided, the pad should be placed over the posterior tibial artery, just above the ankle. Various minute directions have been given for determining the position of the joints. But the following very simple observation will, I am sure, be always found quite sufficient for the purpose. If the surgeon casts his eye upon the space between the outer ankle and head of the metatarsal bone of the little toe, he may easily ascertain the middle distance of these points; and this is the situation of the joint between the *os calcis* and cuboid bone. The other articulation, viz. that of the *astragalus* with the navicular, lies very nearly in the same transverse line; and the projection of the latter bone renders its discovery still more ready and certain. The flaps may be formed either entirely from the sole of the foot, or partly from it, and partly from the integuments of the instep; but the former plan is preferable, as affording a better covering for the bones. In this case it is necessary to make the flap extend fully to the balls of the toes, or farther extremities of the metatarsal bones; and it is here that one is most apt to go wrong, by cutting the parts too short for forming a good stump. In making the incisions, it is recommended to effect the disarticulation before making the flap from below; but I have uniformly found in operating on the dead subject, that it was extremely difficult in this way to cut it smoothly, owing to the relaxation of the parts in the sole of the foot, which ensues upon the separation of the bones. It is much better, therefore, to transfix the foot from side to side, and complete the section of the flap before opening the joints, while the parts are held steady under the knife. After this analysis of the operation, it may be well to give a connected account of the mode of performing it.



The surgeon, having recognized the position of the joints, should place the points of his thumb and fore-finger upon them, embracing the foot in his hand; then, with a small sharp-pointed amputating knife, blunt on the back, make an incision from the one to the other, slightly curved towards the toes, in order that it may correspond to the flap below; and next, instead of opening the joints, run his knife through from side to side, between the bones and flesh of the sole, and cut forwards close to the bones, until he arrives at the balls of the toes, when he terminates the incision, not abruptly, but gradually, so as to have a smooth edge and surface. Nothing now remains but the disarticulation, which may be effected with extreme facility, as the surfaces of the joints are nearly straight, and in the same line.

The anterior tibial and external plantar arteries require to be tied; after which the flap being stitched into its place, compresses and a bandage ought to be applied. The limb during the cure ought to be kept bent to relax the gastrocnemius." 153.

Two cases are given in illustration, but these need not be noticed. We have now done with the present work, and a few words on parting are all that remain. We think that the facts which are detailed by Mr. Syme are sufficient to prove that excision of joints is much more generally useful and advisable than was imagined. We cannot say, but we think that Mr. S. is inclined to go a little too far, but this is a matter of opinion, and we may be wrong. We believe that the operation will come into more or less general use, and then the profession will have the best, indeed the only satisfactory evidence of its merits or defects. It appears to be more applicable to the upper extremity than to the lower, and of all the articulations it seems most adapted to that of the shoulder. Within these few weeks the head of the humerus has been twice excised at St. George's Hospital for caries and disease of the shoulder-joint. Both the patients are doing well.

A word or two on the author, and on the execution of his book. Mr. Syme seems generally actuated by a spirit of candour and fairness in his observations, and he evinces very little prejudice or bias in favour of the views which he more immediately supports. The work is not a model of composition, but that is not to be expected. It is likely to prove useful in the hands of those who may be destined to perform operations, and we suppose that utility is Mr. Syme's chief aim.

## XIII.

### MEDICAL ZOOLOGY AND MINERALOGY; OR, ILLUSTRATIONS AND DESCRIPTIONS OF THE ANIMALS AND MINERALS EMPLOYED IN MEDICINE, AND OF THE PREPARATIONS DERIVED FROM THEM, &c. &c. &c. By *John Stephenson*, M.D. F.L.S.

THE favourable reception which the work on Medical Botany, lately completed, has experienced, would appear to have given rise to the present undertaking. There can be no question that an acquaintance with Medical Zoology would be highly useful, though not absolutely indispensable, to the medical practitioner, and in the present day of intellectual emulation, we doubt not that opportunities for its acquirement would be eagerly embraced by many individuals. The work whose title is given above appears well calculated to fulfil the indications, and will prove an acquisition to the medical public. Its form, size, and price, are precisely those of the "Medical Botany" to which we have already alluded, and we venture to say that the purchasers of one will be the purchasers of both. It is published in monthly numbers, at a moderate expense, and contains a very large amount of useful knowledge, as well as entertaining information. It cannot be supposed that a formal review of a work of this description is admissible, but we may give one or two extracts in order to shew the style and handling of the matter. Of the five numbers which have now (we are writing in May) seen the light, the last is the best. It contains a description of several varieties of snake and serpent. Take the following description of the Egyptian Asp as a specimen.

"NAJA HAJE.—*The Hoje, Asp, or Aspic.*

SPEC. CHAR. *Body* olive brown, variegated with white; *abdomen* whitish, with blackish spots; *neck* capable of inflation; *length* five to six feet.

Le vipere Haje; *Daudin, Rep.* vi. p. 41. L'Aspic; *Geoffroy, Rept. Egypt.* suppl. t. 3.

THIS species, which has attained more than ordinary celebrity from being supposed to be the animal whose poison the famous Cleopatra selected to terminate her existence, is found abundantly in Lower Egypt, sometimes in hedges, and sometimes in the fields. 'It is universally known,' says Mr. Griffith, 'that this illustrious princess, abandoned by fortune, who had so long smiled upon her, commanded that a reptile of this species should be brought to her, concealed in fruits and flowers, and caused it to bite her, to put a period to her misfortunes. But after the fall of the Roman empire, though Egypt still preserved some traces of the high renown of Cleopatra, and though the name of the Aspic was not pronounced without some degree of horror by all the people of Europe, still for a long series of ages the true species of the serpent was unknown, and the Cerastes, the Egyptian Viper, the Ammodytes,* and the Lebetina, were taken for it. Bruce declared for the first of these opinions, Forskal for the last, and

* "The Coluber Ammodytes, *Jacq. Coll.* iv. t. 24, 25, a species greatly allied to the Viper, from which it is distinguished by an erect process or wart at the tip of the muzzle. It is an extremely poisonous reptile, and inhabits the mountainous parts of Illyria."



Laurenti, Hasselquist, Daudin and Count La Cépède, for the second, which undoubtedly has some plausibility, for it is well proved that under the name of ασπις, the ancients were acquainted with many venomous serpents aboriginal of Egypt.

'It has been only since the expedition of the French to Egypt that the true species of the Aspic has been ascertained. During the period of that expedition, the French philosophers attached to the army observed a species of ophidian, regarded as harmless by Linneus and most herpetologists, but considered as extremely venomous by the traveller Forskal. This ophidian is called *hoje* by the inhabitants, and recent travellers have incontestibly proved that it is the true aspic of the ancients, which never inhabited Europe; for the reptile which some years since infested the forest of Fontainbleau, and was called by this name, was nothing but a variety of the common viper; and the *Esping* of the Swedes, is quite another species from the one in question.'*

The ancients entertained a notion that the poison of this serpent is more deadly than that of any other venomous creature inhabiting the East; that its bite, though inevitably mortal, produced no pain or violent symptoms, and merely occasioned the gradual diminution of pulsation, which was followed within twenty-four hours by a profound sleep terminating in death. Galen assures us, that in Alexandria, to shorten the punishment of criminals condemned to death, they were bitten in the breast by an Asp; and Dioscorides asserts that the wounds occasioned by the bite of this reptile are unaccompanied by any local tumefaction, and that they are so small that they appear to have been made with a very fine needle." 89.

Let us turn from the asp, borne amidst roses to the breast of the Egyptian queen, and contemplate one of those frightful and horrid reptiles, which would seem to be inflicted by God upon the earth, as a scourge on the rest of his creation. The most powerful pens have been employed in the endeavour to depict the terror which these creatures inspire in the Islands of the West. The cophias lanceolatus, or yellow viper, which infests Martinique, St. Lucia, and Beconia, is of this appalling character. By a chance or design equally fortunate and inexplicable, these islands alone can lay claim to the unenviable distinction of possessing the viper in question. In St. Lucia and Martinique, the marshes, the tilled grounds, the forests, the borders of rivers, and the mountains, from the level of the sea to the region of the clouds is peopled by the cophias lanceolatus. They are seen every where, their asylum is the sugar-cane plantation, they lie in ambuscade in bush and brake, and they find their way into the cottage, especially into that of the unhappy negro. Our readers will excuse our making another extract.

"These reptiles possess an activity and vivacity of motion truly alarming. A ferocious instinct induces them to dart impetuously upon passengers, either by suddenly letting go the sort of spring which their body forms, rolled in concentric and superposed circles, and thus shooting like an arrow from the bow of a vigorous archer, or pursuing them by a series of rapid and multiplied leaps, or climbing up trees after them, or even threatening them in a vertical position.

The effects of the bite of these serpents are in general very terrible, but vary considerably, according to a multitude of circumstances. The tumefaction of the part, which soon becomes livid and gangrenous, nausea, convulsions, car-

* *The Animal Kingdom, described and arranged in conformity with its organization, by* Baron Cuvier, *with additional descriptions by* Edward Griffith, *F.L.S.* vol. ix. p. 382.

dialgia, and an invincible somnolency, are the ordinary symptoms of the action of their poison, which either produce death in the course of some hours, or at most some days, or causes for several years vertigos, paralysis, more or less extensive, phagedenic ulcers of a malignant character, and a variety of other distressing infirmities. It is therefore nowise astonishing that the Trigonocephalus is an object of horror, not only to man but also to animals. The horse trembles and prances violently in its presence; rats scud away at its approach, sending forth cries of terror; birds especially, against which it wages inveterate war, manifest their aversion to it by repeated clamours; and the Loxia *indicator*, by pursuing with its cries, often indicates to man the place of its retreat.

The African races, which form a great portion of the population of Martinique, constantly preserve certain organs of this reptile for talismans, either preservative or hurtful. These are called in the Carib language, *piailles*, and they are always found among the materials of those magical conjurations undertaken by the negroes who are addicted to sortilege.

The severity of the accident produced by the bite of the Trigonocephalus varies, as in the case of other venomous serpents, according to the state of health of the bitten subject, the depth and number of the wounds, the time which has elapsed since the animal made use of its fangs, and, consequently, the quantity of poison which had penetrated into the system. But in all possible cases the help of art is indispensable." 98.

A variety of remedies have been tried and vaunted, which proves that none have any decided or specific power.

"In the *post-mortem* examination of such persons as have died some time after the accident, Dr. Renzger, a German physician, whose experience on these subjects has been considerable, always found the brain and spinal cord partially softened, and a considerable effusion of bloody serum in the cavities of the skull, thorax, and abdomen; the lungs and liver were gorged with blood, and as well as the intestinal canal, exhibited gangrenous spots; the cellular tissue round the wound was sloughy, and, on incision, a great quantity of decomposed blood and sanies escaped from it.

In those cases which do not end fatally the wound becomes inflamed and erysipelatous, the general symptoms gradually disappear, and the disease altogether ceases within from three to eight weeks, under general perspiration and bilious diarrhœa. Sometimes, however, great debility and cachectic appearances remain, and death ensues, after two or three years, under paralysis, mental derangement, or dropsical symptoms. In case of ultimate recovery, the healing of the wound always takes place very slowly; the skin and neighbouring cellular tissue slough, and discharge a great quantity of blood; the margins of the wounds are of a livid colour, and bleed on the least touch; after some time, the sloughs having come away, suppuration begins to take place, but is always of an unhealthy kind; cicatrization hardly ever takes place before some months, or even years; the cicatrix is thin, of a livid colour, and liable to be inflamed or absorbed.

The best method of treatment consists in the excision of the wounded part, and its subsequent scarification and cauterization. If the necessary instruments are not at hand, the wound must be sucked and repeatedly washed with water, lemon-juice, or brandy, as in other cases of poisonous wounds; at the same time it is advisable to put a tight bandage round the limb. Stimulants must be given internally, and the wound is continually, even after the remission of the general symptoms, to be treated with stimulants and antiseptics, otherwise it will become gangrenous. In India, it appears the Tanjore pill, of which arsenic is the chief ingredient, has been exhibited with considerable success against the bites of venomous serpents. In the second volume of the Medico-Chirurgical Transactions, there is a series of cases related by Mr. Ireland, surgeon of the 60th regiment, where arsenic was administered in very *large* doses with good



effects. Mr. Ireland, on his arrival in the island of St. Lucia, was informed that an officer and several men belonging to the 68th regiment, had died from the bites of the Fer-de-lance, and that every thing had been tried by the medical men, to no purpose, he was determined to give arsenic a full trial. In these cases he exhibited two drachms of Fowler's solution with ten drops of laudanum, in the effervescing draught, and repeated it every three or four hours. Externally, the parts were frequently fomented with warm water, and rubbed with a liniment composed of oil of turpentine, liquid ammonia, and olive oil." 100.

From the foregoing specimens the professional public may form some opinion on the nature and probable value of the "Medical Zoology." The author, we imagine, makes no pretence to its being much more than a compendium, and this is all that is required. We shall watch the progress of the work, and report upon it from time to time. We hope that Dr. Stephenson will not relax in his endeavours to render it as complete and as accurate as possible. There are many errors of the press in the present numbers, and we would recommend the industrious author not to slumber on his post, but to strain every nerve in the progress of his undertaking. We recommend our readers to procure and patronize the "Medical Zoology."

## XIV.

### OBSERVATIONS ON CALCULOUS DISORDERS. By *B. C. Brodie*, Esq. F.R.S., as delivered by him in his Surgical Lectures. Medical Gazette, Nos. 174, et sequent.

OF the importance of an accurate knowledge of the diseases of the urinary organs no practical surgeon nor physician can entertain a doubt. It is true that many difficulties stand in the way of arriving at that knowledge, but the majority are not insuperable, and consequently become a stimulus rather than an obstacle to the success of ingenious and enterprising men. In most diseases, at all events of those organs or tissues which are veiled from sight, we deduce the probable alterations in their structure by more cognizable alterations of their functions. By observing the latter at the bed-side of the sick, and noting the morbid changes of structure presented to our view after death, we couple and connect the one with the other, we mark, compare, and reason, we bring into play the inductive method of philosophizing, and rescue the practice of medicine from much of the obscurity thrown around it, by the empiricism or dogmatism of former ages. It is in this manner, and in this alone, that we can attain to any certain and positive information in medical science. It is by linking symptoms with organic alterations that we ascertain the nature of disease. This is not the whole, to be sure, but it is the foundation on which all that is solid is to be reared, and without it all systems and theories were built but to decay.

In studying the diseases of the urinary organs it is necessary to proceed on precisely the same plan as in the investigation of other organic maladies. We must explore the functions of the parts, both natural and deranged, and mark the corresponding structural alterations; on this is to be erected

the only scientific system of diagnosis and cure. Accordingly we find that the ablest and most philosophical inquirers of modern times have proceeded in this manner. Wollaston, Brande, Marcet, Prout, Bazelius, and many others, have devoted their attention to the healthy and unhealthy conditions of the urine. With the exception of Dr. Prout, few have attempted in a philosophic manner to connect those conditions of the urinary secretion with particular states of the system in general or of the secreting organs in particular. On Dr. Prout's investigations we can hardly pass too high an encomium; they evince a degree of patient enquiry, and of sound induction, which place him high amongst the scientific men of the day. We shall presently see that Mr. Brodie will bear comparison with any, even the best of those whose names we have recorded.

The chemical examination of the urinary secretion presents peculiar difficulties to the analyst. If the other fluids of the body exhibit variations they are rather of degree than of kind, rather consisting in alterations of the relative quantities of ingredients, than of the composition of those ingredients themselves. With the urine it is otherwise. It varies in its characters in health, it varies ten times more in disease. To catch and fix each fleeting feature, would be as vain and as unprofitable a task as to hunt the flying shadows of an April day. In truth, it is hard to say what are the precise components of healthy urine. One chemist tells you one thing, another maintains the contrary, and who is to decide when none agree. A late writer on chemistry makes a few remarks upon this subject which are not undeserving of attention.

"It is difficult when so many substances exist together in a fluid to find out their state of combination; accordingly, very different accounts have been given of the saline ingredients of urine. During the evaporation of a fluid containing salts new affinities are brought into play, and compounds altogether different from those existing in it are procured. But another difficulty presents itself with regard to urine. The *urée*, during the evaporation, generates ammonia, and thus causes the decomposition of some of the compounds and the formation of others. Hence, instead of free uric and benzole acids, urate and benzoate of ammonia are obtained; and in place of the super-phosphates, neutral-phosphates and ammoniaco-phosphates are deposited. It is evident from this, that the substances procured must vary materially, according to the mode of analysis."

Fortunately disagreements in minor points of chemical researches exert no prejudicial influence on practice, and, so far as we know, it matters little to surgeons whether the pyro-uric acid be or be not the succinic. The more prominent, more obvious, and therefore, in a practical view, the more important features are recognized and acknowledged on all quarters. We have said that the knowledge of the diseases of the urinary organs has latterly made perceptible progress in this country. Yet that advance has been rather by the few than by the many, by individuals of talent and acquirements, not by the general mass of the profession. Knowledge to be widely useful must be widely diffused, and in our profession it is of comparatively little benefit to mankind, if the chosen few are its sole possessors. Your rare gems in the cabinets of *virtuosi* are pretty to look at and nothing more. We hail then the publication of Mr. Brodie's experience on calculous diseases, with a high and unfeigned degree of pleasure. There are few men of such sterling practical attainments, very few indeed on whose opinions his professional brethren are inclined to place such complete reliance. He



has reached the summit of his profession by no royal road, by diligent observation of the phenomena of disease, and unwearied cultivation of morbid anatomy, in youth, in manhood, and we trust in age. Those who know him best, and especially those practitioners whose opportunities of testing the value of his professional opinions have been most ample, will acknowledge the justice of the tribute we pay him. We are no sycophants; we do not "flatter to betray," but we had rather run the risk of being accused of flattery, than withhold a public expression of approbation, where approbation is deserved. We could not say less, and we will not say more. We proceed to the analysis, for an analysis it will be, of the lectures in question.

The urine in its natural state is composed of many ingredients, maintained in solution at the temperature of the body. Sometimes, although this temperature is unaltered, and the urine continues in the bladder or urinary passages, one or more of these ingredients is deposited in a solid form. The deposite may be in the form of small particles or sand, or of larger masses termed calculi; but whichever it be, the nature of the disease is essentially the same.

## I. SAND IN THE URINE.

The urine contains, as is well known, a large quantity of uric or lithic acid, not in a free state, for it is very insoluble, but usually in the form of lithate of ammonia, a very soluble salt, which causes the reddening of litmus paper by healthy urine. In very cold weather, the urine, as it cools, deposits the lithate of ammonia, blended with some animal matter. The lithate of ammonia also forms the principal part of the soft or uncrystallized sediment deposited in the vessel by the urine of persons who labour under dyspepsia, and some other diseases. If to healthy urine is added an acid which has a stronger affinity for ammonia than the lithic, such as lemon-juice, the lithate of ammonia is no longer precipitated, but, instead of it, pure lithic acid in the form of numerous small red crystals, resembling particles of cayenne pepper. This change may happen in the body also, from another acid in the urine, causing the precipitation of lithic acid sand even in the bladder. Dr. Prout says that this acid is the muriatic. Those who, from weak digestion, are liable to the formation of acid in the stomach, are also liable to the red sand. If the food be indigestible, or if taken in too large quantity, the same thing may happen in the most healthy person. The free use of fermented liquors, especially such as contain acid, or sugar which may become acid in the stomach, leads to the same result. Persons leading a sedentary life, who perspire little, are especially subject to the red sand. The perspiration, it is well known, is very acid, and it seems as if something was carried off by the skin in perspiration, which would otherwise cause the urine to be loaded with acid. Thus Sir Gilbert Blane long ago remarked that a disposition to calculous disorders is frequently combined with eruptions on the skin.

Urine containing a super-abundant acid, precipitating the red sand, is bright and transparent, and of a copper colour, like that of Madeira wine. The patient has generally dyspeptic symptoms, and frequently is liable to gout, between which and the formation of the red sand there is a close connexion. The same peculiar constitution, the same luxurious diet and in-

active life dispose to both. The chalk-stones formed in the bursæ and cellular membrane of gouty persons are composed of lithate of soda. In the higher classes of society the deposition of red sand exists chiefly in adults, in the lower, among children. Adults in affluent circumstances lead a more luxurious and inactive life than their children; whilst, among the lower orders, the diet of children is frequently unwholesome, and the consequent disorders of their digestive organs neglected.

In many instances the red sand is voided without any particular symptoms, the patient accidentally perceiving it in the urine. In other cases, there are uneasy sensations in the loins, pain in the groins and in the course of the urethra, and sometimes discharge of a small quantity of blood from the urethra. When the latter is irritable and liable to spasmodic affections, the contact of the red sand induces spasm in it, a diminution of the stream, and even difficulty in voiding the urine. In such cases bougies will not cure the stricture, unless combined with the remedies which tend to prevent the formation of red sand.

It is of great importance to put a stop to the formation of red sand, for, in itself an evil, it may lead to the formation of a larger concretion in the bladder. It may almost invariably be prevented by the exhibition of alkaline medicines—potass, soda, lime-water, magnesia, ammonia. One or other may be preferable, according to circumstances, or it may be advisable to give them in combination. If the lithic acid is deposited in small quantity, and the bowels too much relaxed, (which is rare,) lime-water may be useful. In weak persons we may give ammonia. Dr. Prout recommends the carbonate of potass in preference to that of soda, because under certain circumstances soda will combine with lithic acid, and form an insoluble salt as bad as itself, whilst the lithate of potass is perfectly soluble, and will pass off in the urine. On the whole magnesia is preferable to all, for, being in itself insoluble, it cannot enter the circulation, unless it has first become combined with acid in the stomach or intestine, and thence cannot pass out of the system so soon. The dose of the alkalies must vary, but from ten grains to two scruples of magnesia may be given daily; and the others in proportion. Whilst the carbonates agree better with the stomach than the pure alkalies, the carbonic acid does not interfere with their effects. Salts containing a mineral acid, as the sulphates, muriates, nitrates, are of no avail, but the tartrates and citrates produce the same results as the pure alkalies or their carbonates. Thus Sir G. Blane has recommended a very efficient way of exhibiting the carbonate of potass, namely, in a saline draught with excess of alkali.

A good deal of care is necessary in apportioning the dose in such individual case. If too little alkali is given, lithic acid is still deposited, though in smaller quantity; if too much, the urine is rendered alkaline, and the ammonio-magnesian phosphate thrown down. If magnesia is taken in too large quantity, the patient is liable to the formation of magnesian calculi in the intestines, composed of the magnesia mechanically blended with the fæces and intestinal mucus. They are not uncommon now when magnesia is carelessly taken and given. Mr. Wilson found many pounds of magnesia collected in the colon of a patient, above a contracted part of the rectum. In exhibiting alkalies each case should be made the subject of a distinct experiment, and the patient should co-operate with the surgeon. As healthy urine turns blue litmus paper a little red, alkalies should not be given so as to destroy this property altogether, still less to render the urine alkaline. If blue litmus paper reddened by immersion in a weak acid, or in healthy urine, is turned blue by that under examination, the patient is in danger of suffering from a deposition of the phosphates, and the alkalies must be given in smaller quantities. The time when the urine is most acid and alkalies principally required is after dinner; they should be given in three or four hours afterwards, for if sooner they interfere with digestion. Sometimes it is better for the patient to take his medicine when he wakes accidentally in the middle of the night. In many cases only a single dose of magnesia at bed-time is required; in others it should be taken in the middle of the day also.



But it has been truly observed that the exhibition of alkalies is not striking at the root of the disease. When there is costiveness purgatives should be given, and they are useful when the bowels are not particularly torpid. Mercurial purgatives are on the whole to be preferred. A blue-pill may be given every night, with a senna-draught every fourth morning; or a calomel pill once or twice in the week at bed-time, and the draught on the following morning. When the disease is connected with gout, the patient may take twenty drops of the vin. colchici, twice or three times daily at first, afterwards a senna-draught with forty or fifty drops of the vin. colchici occasionally in the morning. But most, after all, is to be effected by diet. If the patient is a great eater he must moderate and simplify his food, and incline to a vegetable diet, avoiding, however, undressed, and especially acid or acescent vegetables. If he commits excesses in drinking, let him give up fermented liquors, or use them very sparingly; the French wines are injurious, especially champagne, but our own punch is worse than any.

If the patient has been in the habit of dining late in the evening, and going to bed soon after a hearty meal, he should alter his habits in this respect. If he has led a sedentary life, he should walk or ride daily, so as to induce perspiration. Those who take much exercise, may commit imprudences in diet, which they could not otherwise do with impunity. Copious perspiration may be produced most effectually by the use of the sulphur, fumigating, or hot-air bath. The latter is of great advantage to those who lead an inactive life and are subject to gout, as well as to those who have too large a proportion of lithic acid in the urine. The perspiration produced is highly acid, reddening the litmus paper even more readily than the urine does.

The red is not the only sand deposited by the urine. Sometimes it deposits distinct white particles, minute crystals of the triple phosphate. Here it is alkaline, turning reddened litmus paper blue, or, if very alkaline, yellow turmeric paper brown. According to Dr. Prout, the formation of this white sand takes place in the following manner. The urine ordinarily contains the phosphate of magnesia, a soluble salt, and held in solution. In certain states of disease the urea becomes decomposed in the kidneys, and ammonia is evolved, which combines with the phosphate of magnesia to form the triple salt; this being insoluble, is precipitated in the form of a white sand. Dr. P. also says that the same state of system which leads to the decomposition of the urea and evolution of ammonia, leads also to a more abundant formation of the phosphate of magnesia, whence arises the immense deposition of white sand.

The state of the system which leads to the establishment of alkaline urine and of white sand is very different from that which is attended with too acid urine, and with red sand. The latter occurs in those who are overfed and over-stimulated—the former is the result of debility, the symptom of an asthenic state of system, observed in those who are exhausted by too severe mental or bodily exertions, or who have long been worn down by mental anxiety. In many instances a course of mercury renders the urine alkaline, in some persons a single dose of calomel will do so, apparently from the debilitating effect of this mineral. In a weak person the exhaustion produced by an active purgative will do the same. As might be anticipated, the too abundant exhibition of alkaline remedies will lead to the same result. Injuries of the spine were first observed by Mr. Brodie to produce alkaline urine in the year 1807, and since that time the observation has been confirmed by general experience. This is equally the case whatever part of the spine is injured, whether the bladder be or be not paralytic. It continues even after the patient has recovered from all his other urgent symptoms. The same thing occurs where there is disease of the spine independent of mechanical injury. In a case of *ramollissement* of the lower half of the medulla, a true case of *tabes dorsalis*, produced by excessive venery, one symptom was a half-paralytic state of the muscles of the lower limbs, another was the highly alkaline condition of the urine. At the commencement of the paraplegia the urine was excessively acid, and it became alkaline as the paraplegiac symptoms advanced. This confirms a remark of Dr. Prout's, that alkaline urine is often preceded by a too abundant formation of lithic acid. In females labouring under aggravated hysterical affections the urine is frequently alkaline, and deposits the triple phosphate in abundance. The same persons are also liable to have red or lithic sand in the urine, and not unfrequently the two kinds alternate with each other. It is astonishing what a quantity, sometimes of one sometimes of the other, occasionally passes off in these cases.

Those persons who habitually secrete alkaline urine are generally pale and sallow; incapable of much bodily and mental exertion; complaining of lassitude and weariness. When this state of things has existed for some time their bowels become irregular, and they exhibit other marks of debility. These are the symptoms generally present, but in some few cases it is otherwise. Mr. Brodie has a gentleman at present under his care voiding alkaline urine although his health is good, and he suffers only from a costive state of bowels.

Besides the triple phosphate, another salt, the phosphate of lime, is frequently to be detected in the urine. A small quantity seems to be occasionally generated by a diseased kidney; but the greater proportion is derived from another source.

"Dr. Austin, physician to St. Bartholomew's Hospital, in the year 1791, published a Treatise on Stone in the Urinary Bladder, in which he states that 'the main result of his inquiries has been, that the stone is formed generally in very small parts, and often in no degree whatever, from the urine as secreted in the kidneys, but chiefly from mucus produced from the sides of the different cavities through which the urine passes.' The late Mr. Chevalier, in the second volume of the Medico-Chirurgical Transactions, published some observations which were intended to confirm Dr. Austin's hypothesis. These notions, however, attracted but little attention, even when first promulgated; nor is this to be at all wondered at, when we consider how much they are at variance with a



multitude of well known facts. Nevertheless, they are not absolutely without foundation. Dr. Austin was in an error, inasmuch as he mistook the exception to the general rule, for the rule itself; but no further. It is true that calculous matter in by far the greatest number of instances is a deposit from the urine, but under certain circumstances it is generated by the mucous membrane of the bladder. How this happens was first distinctly explained by Dr. Prout.

I have described to you, in a former lecture, the phenomena which belong to chronic inflammation of the mucous membrane of the bladder. One of its effects is the secretion of a ropy adhesive mucus in a most abundant quantity. This mucus is highly alkaline, containing the carbonate of soda, which is a soluble salt; containing also the phosphate of lime, which is insoluble. The latter is frequently seen presenting the appearance of white streaks in the mucus. In some cases it is produced in still larger quantity, and it comes away, not in the form of white sand, but in that of small white irregularly-shaped masses, resembling fragments of mortar." 7.

This formation of the phosphate of lime may take place where there is no triple phosphate in the urine, and sometimes on testing you find the urine itself acid, though the mucus is alkaline. To succeed properly in this experiment, the urine and the mucus should be tested just as the latter has been deposited. If you wait some time longer putrefaction begins, ammonia is evolved, and the whole is rendered alkaline. The triple phosphate and phosphate of lime have different origins, and either may exist in the urine without the other. They frequently, however co-exist, and this combination is probably produced in one of the following ways. The primary disease may be a secretion of alkaline urine in the kidneys. This irritates the membranous surfaces with which it comes in contact, and, if it continues for a certain time, induces chronic inflammation of the mucous membrane of the kidneys and ureters, extending to the bladder, and giving rise to the formation of a large quantity of adhesive mucus, containing the phosphate of lime. Or, the chronic inflammation of the mucous membrane of the bladder may be the primary affection. This cannot last long without affecting the constitution; it excites low febrile disturbance attended with much debility, a state of system very liable to occasion a secretion of alkaline urine in the kidneys. In one or other of these ways the triple phosphate and the phosphate of lime become associated with each other, sometimes one and sometimes the other being the original malady.

The treatment of patients affected with the white sand is to be conducted on very different principles from that which we adopt to prevent the formation of the red. The deposition of the triple phosphate argues great general debility, and whatever increases that debility aggravates the disease. Purgatives must be used with great caution, mercurial purges must be carefully avoided. Alkalies must be carefully avoided also, though Mr. Brodie has frequently seen them given, with the very worst effects, by those who had a notion that alkalies were good for the gravel. It has been said that alkalies are useful where the digestion is bad, although the urine at the time is alkaline. Mr. B. has every now and then seen a case in which *small* doses of soda were given with advantage, but he is sure that such cases are exceptions to the rule. The principle which leads us to avoid alkalies, leads us to exhibit acids. The vegetable acids are very fit to be employed where they do not disagree with the stomach, and the patient may drink lemonade, or eat oranges or lemons in the necessary quantity. If the vegetable acids disagree with the stomach, as they frequently do, the mineral acids may be

substituted for them: from five to ten minims of the muriatic acid, or from fifteen to forty of the diluted nitric being given three times daily. The dose of the acid must be regulated by a frequent examination of the urine with test papers. Tonics, as bark, quina, bitter infusions, sulphate of iron, muriated tincture of iron, are likely to be useful. The diet should be plain, rather generous, consisting of a due mixture of animal and vegetable food. Fermented liquors may be taken in moderate quantity, and, for the most part, the acid wines, as Hock and Moselle, are preferable to others. Dr. Prout has pointed out the good effects of opium, hyosciamus, and other narcotics. If opium does not interfere with digestion, and in these cases it generally does not, from half a grain to a grain may be given twice or three times daily. The patient must avoid all severe exercise of body or mind, and if possible he should be agreeably occupied by some light employment. Courses of mercury, nay, a single dose of it, are likely to be injurious, as is the case with antimony and other diaphoretics.

"Where the phosphate of lime is deposited in consequence of a ropy mucous secretion from the mucous membrane of the bladder, you are in the first instance to endeavour to remove the cause on which the secretion depends, namely, the chronic inflammation of the membrane. I must refer you here to the observations, which I made in one of my former lectures, briefly recapitulating, however, what I then said on the subject. Bleeding not only does not tend to diminish the inflammation, but is actually injurious. The first thing to be done is to discover the cause of the inflammation, and to remove it, if possible. It may depend on stricture of the urethra, and may be relieved immediately on the stricture being dilated with a bougie. It may depend on a partial retention of urine in the bladder, in consequence of an enlargement of the prostate gland. The bladder must then be emptied artificially by the introduction of a gum catheter, once, or twice, or three times daily. It is seldom advisable in these cases to keep the catheter constantly retained in the bladder, for then the catheter becomes in itself a source of irritation, keeping up the inflammation of the bladder, and adding to the cause, on which the deposition of the phosphate of lime depends. Perfect rest in the horizontal posture, opium, suppositories, and narcotics by the mouth, will be useful also. The exhibition of the decoction of the root of the *pareira brava* is, in many instances, productive of excellent effects. It has a remarkable influence over the secretion of the ropy alkaline mucus. Injections into the bladder of warm water, and even of a weak solution of nitric acid, are sometimes useful; but of the cases in which these last remedies are to be recommended, I shall speak to you more particularly in a future lecture.

Where these two diseases, namely, the secretion of the triple phosphate of ammonia and magnesia by the kidneys, and of the phosphate of lime by the bladder, are co-existent (and this is a very common occurrence,) you must combine the two modes of practice which I have just described with each other. They are quite compatible, and in fact there are very few of the remedies which are useful in the one case which are not also useful in the other." 8.

## II. RENAL CALCULI.

There are various kinds of renal calculi, differing from each other in chemical composition; some of frequent, and others of rare occurrence. The most common are those composed of *pure lithic acid;* they are generally of round or oval form, of light brown colour, and tolerably smooth on the surface. Next in order of frequency are the *oxalate of lime*, or *mulberry* calculi; of dark colour, usually of irregular figure, with a number of small prominences on the surface. Thirdly, the *triple phosphate of ammonia and magnesia* is sometimes deposited in the kidney, but, so far as Mr. Brodie



knows, a renal calculus is never composed entirely of this salt. Where a calculus has been lodged in the kidney for a considerable time, the triple phosphate is found to constitute its external layer, but the nucleus is either lithic acid or oxalate of lime. Fourthly, phosphate of lime calculi are occasionally formed in a diseased kidney, probably not from the urine, but from the other secretions of the organ. Mr. Brodie has in his collection two kidneys entirely filled with calculi of this description.

Renal calculi, composed of lithic acid, chiefly occur in those who have led luxurious and indolent lives, and begin to form, in most instances, at about forty years of age. Many such persons are also liable to gout, the two affections sometimes alternating, at others running on together. Some individuals void a great number of these calculi in succession. We find them of various sizes, from that of a pin's head to that of a horse-bean. Oxalate of lime calculi are much more rare, and when the disposition to them exists they are not formed in such numbers as the lithic acid calculi. A patient may void one and never void another, or he may pass a second after a lapse of many years. In one instance Mr. Brodie discovered five or six in one kidney after death; which was occasioned by extensive suppuration of the organ, and complete disorganization of its glandular structure. In reference to Mr. Earle's opinion that the formation of renal calculi may frequently be traced to a local injury affecting the loins and kidney, Mr. Brodie observes:—

"First.—Where a disposition to form calculi exists, a mechanical injury may (I doubt not) determine the disease to one kidney rather than to the other; but this disposition is so manifestly connected with a peculiar state of the system, and peculiar habits of life, (especially in cases of lithic acid calculi,) that we seem to be scarcely justified in regarding it as arising altogether from the agency of a local cause.

Secondly.—It is not improbable that, in some cases in which a mechanical injury has preceded the formation of calculi in the kidney, the first effect of it has been to occasion disorganization of the glandular structure and abscess, and that the calculi generated under these circumstances have been composed of the phosphate of lime, derived, not from the natural secretion of the urine, but from the morbid secretions of the diseased part; and corresponding to the concretions of the same kind which are not unfrequently met with in other diseased textures." 66.

The following very accurate account of the symptoms produced by the presence of a renal calculus, and its descent along the ureter is deserving of attention.

"When a small calculus is formed in the kidney, it usually occasions some degree of pain in the corresponding loin, and the urine is observed to be tinged with blood, especially after any jolting exercise. These symptoms, however, are by no means constant, and it often happens that the patient has no suspicion of his labouring under the disease until the calculus begins to descend from the kidney into the bladder. Even in its passage along the ureter, if the calculus be very small it may be productive of little or no inconvenience. If, however, it be large enough to occupy the whole diameter of the ureter, or in any degree to stretch or distend it, there is considerable suffering. When the calculus first enters the ureter, there is usually pain, referred to the region of the kidney and the groin. The pain is often very severe, and in that case attended with sickness and vomiting, prostration of strength, cold extremities, a feeble pulse, and a pallid countenance; in short, the patient is in what is commonly called a state of collapse. These symptoms are followed by pain referred to the inside of the

thighs and the testicle; and frequently the testicle is drawn upwards to the groin by a spasmodic contraction of the cremaster muscle: no relief is experienced until the calculus has escaped from the lower orifice of the ureter, and entered the bladder; but as soon as this has happened, the patient's tortures (for they truly deserve that appellation) are at an end. The time occupied by the passage of the calculus along the ureter varies in different cases, according to the dimensions and figure of the calculus, and the impulse which it receives from the current of urine behind it. Sometimes the calculus may reach the bladder almost immediately; at other times it may be lodged in the ureter for many hours, or even for two or three days. Where the passage of it is thus protracted, the parts, to which the pain is sympathetically referred, become tender to the touch, and the testicle not unfrequently is actually inflamed and swollen, the inflammation of it continuing for some time after the cause which produced it has ceased to operate." 66.

Amongst the higher and more luxurious classes of society, and it is usually in an individual likely to suffer from gout, we sometimes remark a somewhat similar train of symptoms, although the cause is wholly different. The patient complains of pain, at first in the region of the kidney, then extending downwards in the direction of the spermatic cord to the groin; afterwards there is a frequent desire to make water, the effort being attended with considerable, and sometimes violent suffering. The urine is scanty, of deep pink colour, depositing a pink sediment; when tested, unusually acid. If not relieved by art, such symptoms may continue for several days—if suitably treated, they may subside in a few hours. Cupping on the loins; colchicum, at first in the dose of a drachm and a half, followed by two doses of half a drachm at intervals of four hours; and a senna draught will probably complete the cure. Mr. B. imagines that there is gouty inflammation of the kidney.

In most cases, a kidney-calculus gets into the bladder soon after its first formation; but in some it remains for a considerable time in the kidney, and is dislodged at last by some accidental circumstance. This happened to an old gentleman who was overturned in a carriage with some ladies. On reaching home the bladder was much distended—he strained violently to make water, and at length a kidney calculus, having the form of one of the infundibula, was projected with much force into the chamber-pot. In other cases, a long impacted kidney-calculus is dislodged in consequence of some change which takes place spontaneously in the organ, independently of mechanical injury. Sometimes calculi detained in the kidney produce no inconvenience, indeed no symptoms whatever, being frequently found after death, when they had not been suspected during life. In other instances there is pain in the loins, and the urine is occasionally tinged with blood, especially after jolting exercise, as riding on horseback. Though these symptoms seldom fail to indicate calculus in the kidney, they may arise from other causes. Mr. Brodie has once seen them produced by fungus hæmatodes in the kidney. In other cases he has thought that bloody urine depended on a relaxed state of the vessels of the kidney, but no dissection was obtained to corroborate the suspicion.

Dissection of the bodies of those who die with calculi of the kidney throws great light upon the subject. In the early stages of the disease, small portions of calculous matter are found imbedded in the mamillary processes; afterwards the calculous concretion partly projects into the infundibulum; by and bye it escapes into the infundibulum and pelvis of the kidney altogether. Probably it is now propelled by the urine into the bladder. It



may remain in the kidney, increase in size from fresh deposits of calculous matter, or even grow so large as to occupy the whole of the pelvis of the kidney, extend into the infundibula, assume the form of the parts in which it is lodged, and bear some resemblance to a piece of madrapore. In these cases, the outer layers are commonly composed of the triple phosphate, the nucleus being lithic acid or oxalate of lime, more frequently the former.

The ureter is seldom completety obstructed. When it is so, the urine necessarily becomes accumulated in the infundibula—these are dilated into large membranous cysts—the glandular structure is expanded, and in a great measure absorbed, so that in some cases the kidney is at last composed of a large membranous bag, consisting of a number of cells, communicating with each other and containing urine. Sometimes the kidney is wasted, the only remnant being a membranous substance, adhering to an irregularly-formed calculus. In such circumstances, the other kidney supplies the place of the affected one, and does double duty in consequence. The two changes in the state of the kidney alluded to belong to the same series of events. The kidney having been dilated to a mere membranous cyst, the urinary secretion ceases, the accumulated urine is absorbed, the cyst collapses and contracts, and at length it becomes a mere capsule, in which the calculus remains imbedded. An enlarged kidney forms a tumour to be felt readily in the abdomen of a thin person. The preceding statements will account for the occasional disappearance of such tumours.

A calculus lodged in the kidney not unfrequently induces ulceration and suppuration of that organ. The pus may escape with the urine, and pass into the bladder, when there is little or no constitutional disturbance, the symptoms being local, and rather directing attention to the bladder than the kidney. In a lady the symptoms were, a frequent desire to make water, which was voided only in small quantities—a cutting pain referred to the neck of the bladder—at first muco-purulent secretion, and afterwards true pus in the urine. Sometimes the abscess thus produced in the kidney has no exit into the ureter. There is a different order of symptoms.

"There is pain referred to one loin, extending to the groin, sometimes upwards towards the scapula, or forward across the abdomen; not in general aggravated by exercise. Not unfrequently there is an irritable state of the bladder, though this symptom does not exist in the same degree as where the pus escapes with the urine. The patient suffers from a sense of remarkable lassitude and depression, and he has occasional rigors; sooner or later he falls a victim to the malady, and the following symptoms mark his approaching dissolution. The pulse is small; there is a total incapability of mental as well as of bodily exertion, an utter listlessness and disregard of all external circumstances. The pulse becomes so feeble that it can be scarcely felt, and the extremities are cold. Sometimes there is sickness and vomiting, at other times a diarrhœa, which it is scarcely possible to check by the most powerful astringents. The urine in these cases is generally secreted in very large quantity. It is also albuminous, being rendered opaque by heat and by the addition of nitric acid. Albuminous urine is met with almost invariably where there is abscess of the kidney; but you are not to conclude that this alone is a certain sign of the existence of abscess. Chronic inflammation of the kidney may cause the urine to be albuminous, although there is no abscess; and an admixture of even a small quantity of blood with the urine will produce the same effect." 69.

In a few rare cases an abscess, connected with calculi of the kidney, presents and bursts in the loins. Some have spoken of an operation for the extraction

of calculi from the kidneys. The proposal is absurd; but nephrotomy is very practicable where Nature, by the formation of an abscess, has pointed out the exact situation of the calculi. And now of the treatment of renal calculi.

A person is voiding a number of small lithic acid calculi in succession. Those which are formed cannot be dissolved, but, by attention, new calculi may be prevented from being generated. Purgatives and alkalies, the colchicum where there is a disposition to gout, attention to diet, and to modes of life, are the means to be employed. Little can be done in the way of prevention, where the calculus is of the mulberry kind; fortunately this is much less likely to occur than the lithic acid. The formation of the phosphate of lime calculus in the kidney always indicates disease of that organ, probably abscess. Whatever it be, we cannot be wrong in administering the mineral acids. When a calculus is passing from the kidney to the bladder, we can do but little; we may give opium in large quantity when the pain is unusually intense, the hip-bath and abundance of diluting drinks. Mr. Brodie has sometimes thought that the patient derived benefit from the exhibition of an active purgative.

If there is reason to suspect that a stone is lodged in the kidney, it is desirable that it should be made, if possible, to pass into the ureter, before it is so large as to be incapable of being conveyed along it into the bladder. Hard trotting on horseback generally produces bloody urine, which shews that the calculus is made to undergo some change of position, a favourable circumstance. Diluents and diuretics may be useful; so are cupping or leeches where there is considerable pain in the loins and neighbouring parts. Sometimes the application of a belladonna plaster is serviceable. Mr. Brodie thinks that setons and issues are seldom so, except where disease in the kidney, especially abscess, has been induced. In such a case they are often of marked benefit. Where abscess is confined in the kidney, and there are symptoms of depression and exhaustion, art can afford little or no assistance; the patient struggles against his fate in vain.

When a calculus is impacted in the ureter, it might be supposed that this tube would continue to be dilated above the obstruction, until it should give way. Morgagni quotes such a case from another author; but Mr. Brodie relates two cases which prove that it does not always happen. In one, no urine flowed, nor could any be drawn off by the catheter in the bladder, the patient became comatose, and died convulsed on the twelfth day after the commencement of the attack. On dissection, there was no urine in the bladder. In one kidney there were several calculi—in the other none. In the ureter of the latter, high up, a calculus was wedged in. In a case which occurred to Mr. Travers, both ureters were completely obstructed by calculi. As in the first case, there was an entire suppression of urine.

### CALCULI OF THE BLADDER.

Any foreign body retained in the bladder for a certain length of time is liable to have calculous matter deposited upon it; and a calculus being thus generated, increases in size more or less rapidly, according to the composition of the urine. The most ordinary nucleus of a calculus, is one which has descended from the kidney; but a hazel-nut, a piece of flower-stalk, any foreign substance, in short, accidentally introduced into the bladder, may give rise to it. In the museum of the hospital are several small calculi,



obtained from the bladder of a female, chiefly composed of the phosphate of lime, which indicates disease of the mucous membrane of the bladder, and each having a small fine hair, running longitudinally through its centre. Mr. Brodie suspects these hairs to be of a similar character with those which are occasionally found in encysted tumors and in other diseased structures. Mr. Brodie attended a gentleman with calculus in the bladder, who finally died of disease in the kidney. Every now and then Mr. B. detected small hairs in his urine, which he had reason to believe had come from the kidney. There was no post-mortem examination in either patient.

In cases of diseased bladder, where the mucous membrane is affected with chronic inflammation, earthy matter, composed chiefly of the phosphate of lime, is formed in small masses resembling mortar; any one of which may be retained in the bladder, and is liable to have calculous matter deposited upon it. Calculi, we need scarcely say, differ in their composition; and, for the light which modern investigations have thrown upon the subject, we are indebted to Wollaston, Prout, Brande, and other scientific chemists, whose names are familiar to the philosophic world. For the description of the various calculi we may refer to Mr. Brodie's summary, or to any standard work upon chemistry; it is sufficient for us here to enumerate their names. The substances then which enter into the composition of calculi of the bladder are—lithic acid—oxalate of lime—the triple phosphate of ammonia and magnesia—the phosphate of lime—the fusible calculus, or mixture of the two latter—the lithate of ammonia—lithate of soda—cystic oxyde—carbonate of lime, very rare—xanthic oxyd—and lastly, fibrinous calculus. Mr. Brodie found the latter in the bladder of a patient after death, who, during life, had not been suspected of labouring under stone. The kidneys had the appearance described by Dr. Bright as existing, when the urine is albuminous, but the urine had not been examined.

"In some cases we find a calculus composed throughout of one of the substances, which have been described, nearly pure; but at other times we find these substances variously combined with each other. The best mode of examining a calculus is to have it sawn through the centre. We then find, that in some of the compound calculi, the different substances are disposed in layers, the lithic acid distinct from the oxalate of lime; the oxalate of lime distinct from the triple phosphate, and so on; while in others they are intimately blended together.

It is only when they are divided in the manner which I have mentioned, that we can learn the true history of the formation of calculi. As Mr. Brande long ago observed, the centre or nucleus is generally either lithic acid or oxalate of lime. In many cases the additions to the calculus are of the same chemical composition with the nucleus; in other cases, we find the lithic acid deposited on the outside of the oxalate of lime; and more rarely, the oxalate of lime is deposited on the surface of the lithic acid. The deposit of lithic acid, or oxalate of lime, may take place in the bladder where there is no evident disturbance of the general health. If the general health becomes affected, and the bodily powers of the patient are impaired, either from the irritation of the stone in the bladder, or from any other cause, the urine becomes alkaline, and, in consequence, the subsequent additions to the calculus are formed of the triple phosphate of ammonia and magnesia. When the calculus has existed for some time in the bladder, it frequently happens, and indeed it always happens sooner or later, that the mucous membrane becomes inflamed; adhesive, tenacious mucus is secreted, which contains phosphate of lime; and this, being blended with the triple phosphate, forms the fusible calculus. Calculi formed in the ducts of the prostate gland, as I shall explain to you hereafter, are composed of

phosphate of lime, pure, or nearly so; whatever may be the condition of the bladder, it very rarely happens that you find a simple phosphate of lime calculus in it. The phosphate of lime may be deposited in small masses, as I have explained to you formerly, but this nucleus being exposed to the contact of the urine, and the health becoming impaired, as always is the case under these circumstances, the triple phosphate is added to the phosphate of lime, so as to constitute a fusible calculus.

For these latter observations I am indebted to Dr. Prout. He has also furnished us with a knowledge of the following most important and interesting facts in the history of calculous formations. The phosphates very rarely form the nucleus of a calculus; but being once deposited, they continue to be so, and are never followed by other depositions. The phosphates may succeed the lithic acid, or the oxalate of lime, but neither of these ever succeed the phosphates. If the external surface of a calculus is composed either of the lithic acid, or of the oxalate of lime, you may be certain that there are no phosphates in the interior; whereas, if there are the phosphates on the outside, the general rule, to which there are but few exceptions, is that some other substance lies underneath." 131.

Calculous disorders prevail differently in different classes of society, at different ages, and in different climates and districts. Among the lower classes children are much more subject to them than adults; among the higher classes it is the reverse. The explanation has been already given when speaking of the tendency to lithic acid sand; for lithic acid forms the nucleus of the greater number of calculi. Persons of middle age in all classes are least subject to stone; women suffer less frequently than men, owing partly no doubt to their more temperate mode of life, partly to their greater capacity and simplicity of urethra. Mr. Brodie adverts to Mr. Copland Hutchison's notions respecting the infrequency of calculous disorders amongst sea-faring men. Mr. B. has operated on two officers in the navy, in whom the symptoms came on during actual service. Besides this, we must consider that sailors consist almost entirely of individuals neither very young nor very old, the class least liable to stone. It is altogether difficult to obtain precise data in such an enquiry.

Calculous diseases also prevail in particular districts, for which it is difficult to offer a satisfactory explanation. Thus, in the same district, persons are not only more disposed to lithic acid stones, but also to those of oxalate of lime, and it is not easy to imagine how peculiarities of diet, or of mode of life, should occasion both.

Calculi, for the most part, lie loose in the bladder, but sometimes they are encysted. In one specimen of this kind preserved by Mr. Brodie, there is enlarged prostate gland, which no doubt gave rise to the cyst, by preventing the bladder from being completely emptied. Here the cysts were formed by protrusions of the mucous membrane through the interstices of the muscular coat. In another specimen possessed by Mr. B. the stone was imbedded in a cyst near the fundus of the bladder, but the cyst is formed by dilatation of both the muscular and mucous tunics. The calculus was not so closely embraced by the cyst but that it might occasionally slip out; and it should be mentioned that the severe symptoms of stone during life would come on suddenly every now and then, the patient in general suffering little or nothing. Adherent calculi are very infrequent. It is not very uncommon for a diseased bladder to be incrusted in some part with calculous matter, but that is a very different thing from an adherent stone. Occasionally coagulable lymph is effused from the inflamed



mucous membrane of the bladder, which also secretes the adhesive mucus, containing the phosphate of lime; a portion of this, mixed probably with the triple phosphate from the urine, is deposited on the lymph, just as, after lithotomy, the same sort of deposition will sometimes take place in the wound. In many cases there is only a single stone in the bladder, in others, two or three, or, occasionally, even many more than these. When there are more than one they are more or less polished from attrition, and assume the shape of irregular polyhedra.

The symptoms produced by calculi in the bladder next engage Mr. Brodie's attention. Different individuals suffer in very different degrees; and even the same individual does so at different stages of the complaint. The symptoms vary; 1st, according to the size of the stone, its smoothness, roughness, figure—2dly, according to the quality of the urine, whether too acid or too alkaline, in either case too stimulating—3dly, according to the state of the bladder, for nothing aggravates the symptoms so much as inflammation of the mucous membrane of the bladder. The symptoms themselves need not detain us, so many excellent decriptions of their course and order being in every body's possession.

In some instances the disease may exist for many years, without the symptoms becoming severe, but in general they are progressive and reach their height in the course of two or three years.

"At first, the patient's general health is unaffected; but by-and-by the health begins to suffer, the urine becomes alkaline, and the triple phosphate is deposited on the original stone. Now all the symptoms are much aggravated. The alkaline urine is more stimulating to the bladder than healthy urine, and this is one cause of the patient's increased sufferings. Another is, that that state of the general health which causes the alkaline urine to be secreted by the kidney, is attended with an increased or morbid sensibility of the nervous system generally.

As the disease advances, the continued irritation kept up by the stone, induces inflammation of the mucous membrane of the bladder. There is now a still further augmentation of the patient's sufferings. The stone is rolling about in an inflamed bladder, and you know how the sensibility of every organ in the body is increased by inflammation. The existence of this state of things is indicated by the greater pain, and by the desire to make water being almost constant; by the urine coming away offensive to the smell, soon becoming putrid and ammoniacal, and depositing the usual thick tenacious mucus streaked with blood. This mucus, as I have already explained to you, leads to the formation of the fusible calculus; and all that I have now stated will lead you to understand that different kinds of calculus are attended with different degrees of suffering. A patient with a simple lithic acid calculus, suffers less than one with a calculus composed externally of the triple phosphate; and the latter less than a patient with a fusible calculus. The oxalate of lime or mulberry calculus, on the whole, occasions more distress than the lithic acid calculus; probably on account of the irregularities which so frequently exist on the surface of the former: but it occasions less distress than the calculi composed of the phosphates." 155.

Patients with enlarged prostate gland are particularly liable to stone in the bladder, in consequence of the organ being never perfectly emptied, and small kidney calculi or lithic sand being detained in it. Sometimes an enlarged prostate occasions a calculus in another manner; the mucous membrane of the bladder becomes inflamed, the mucus which is secreted deposits the phosphate of lime in small mortar-like masses, and each of these becomes the nucleus of a calculus. On examining the body, you find several calculi of irregular forms, small size, of white colour, and rough on the surface.

"Patients with diseased and enlarged prostate do not in general suffer more

from the stone in the bladder than other individuals. Indeed I am inclined to believe that, on the whole, they suffer less; probably in consequence of the tumour of the prostate preventing the stone falling down on the neck of the bladder. I have, however, seen three cases, in each of which there was a stone in the bladder, complicated, not only with an enlarged, but ulcerated prostate; and the sufferings of these patients were greater than I had ever before witnessed in persons labouring under the same disease. They were, indeed, most horrible. In two of these cases, the surgeon who was in attendance (as I think) indiscreetly performed the operation of lithotomy. One of them died in about five minutes after the operation; the other became immediately comatose, and died in a few hours. The third patient was admitted into our hospital, under the late Mr. Ewbank. The symptoms were precisely similar to those which existed in the two other cases, and Mr. Ewbank, on the result of these cases being stated, very properly determined not to perform an operation, although the man had come into the hospital for the purpose. The poor fellow died in two or three days afterwards, and, on examining the body after death, we found a large stone and an ulcerated prostate, as had been anticipated." 135.

Calculi in the bladder frequently induce spasmodic stricture, and from the increased efforts to expel the urine, the muscular coat of the bladder always becomes thickened. Stone in the bladder admits, in the male sex, of nothing approaching to a natural cure. It may be a year, it may be ten, or even more, before dangerous symptoms arrive, but sooner or later the stone will prove the cause of death. The immediate cause of the patient's destruction is, in the great majority of instances, inflammation of the mucous membrane of the bladder. Chronic inflammation may exist long, and admit of recovery, but if it becomes acute, or even approaches to it, the situation of the patient becomes dangerous, nay, desperate. The inflammation extends up the ureter to the kidneys, and even their glandular structure becomes affected. In a patient of Mr. Keate's, who had laboured under stone for many years, the kidneys were converted into a substance resembling fungus hæmatodes, though not decidedly such. Sometimes abscesses form in the kidneys, at others there is a collection of muco-purulent fluid found after death in the pelvis and infundibula. Sometimes inflammation extends to the loose cellular membrane round the bladder, and putrid sloughy abscesses are formed in it.

In a very few cases the bladder ulcerates, and the stone escapes from its cavity. A remarkable case of this kind occurred to Sir Everard Home. There was a fistula in perineo, he operated for the stone, and the latter was found lying in an ulcerated cavity in the perineum. The man died, the bladder was very small and ulcerated, and the ulcer communicated with the ulcerated cavity in the perineum.

Mr. Brodie suspects that abscess in the cellular membrane of the pelvis, unconnected immediately with the bladder is not an uncommon occurrence in those cases in which the patient is allowed to linger on and die of the disease. In a patient who died in a very short time after the operation of lithotomy, a very large abscess was found in the pelvis, communicating with the bladder by an ulcerated opening on one side of its neck. In another case, there was an abscess, occupying nearly the whole pelvis, but not communicating with the bladder. The patients died so soon after the operation that it appears evident to Mr. Brodie, that the abscesses must have existed before its performance.



# Periscope;

OR,

## CIRCUMSPECTIVE REVIEW.

"Ore trahit quodcunque potest, atque addit acervo."

### I.

To the Editor of the Medico-chirurgical Review.

*Apothecaries Hall, April 14th*, 1831.

Sir,

Numerous applications continuing to be made by gentlemen in almost every department of medical science, desiring to be recognised as lecturers by the Court of Examiners of the Society of Apothecaries, the Court feel anxious, in order to save the time now necessarily expended in correspondence with each successive applicant, that the Rules which the Court have laid down for their own guidance in the recognition of the various courses of lectures required by them should become generally known to the profession: they have therefore desired me to transmit these rules to your Journal, with a request that you will be kind enough to give them an early insertion.

I have the honor to be, Sir,
Your obedient Servant,
John Watson,
Secretary to the Court of Examiners.

*Rules to be observed in the Recognition of Lecturers, extracted from the Minutes of the Court of Examiners, dated Nov. 18th*, 1830.

Resolved,

1. That any person being a Member of the Court of Examiners shall not be recognised as a lecturer on any branch of medical science.
2. That the Court will not recognise any new teacher who may give lectures on more than two branches of medical science; nor will they sanction a teacher already recognised in giving lectures on any *third* branch of the science, if already he gives lectures on *two*.
3. That the Court will not recognise a teacher until he has given a public course of lectures on the subject he purposes to teach; but if, after such preliminary course of lectures, the teacher should be recognised, the student's certificate of attendance on that course will be received.
4. That the Court will not recognise a teacher until he has produced very satisfactory testimonials of his attainments in the science he purposes to teach, and also of his ability as a teacher of it, from persons of acknowledged talents and distinguished acquirements in the particular branch of science in question.
5. That satisfactory assurance shall also be given that the teacher is in possession of the means requisite for the full illustration of his lectures, viz. that he has, if lecturing on Chemistry, a laboratory and competent apparatus: on Materia Medica, a museum sufficiently extensive: on Anatomy and Physiology, a museum sufficiently well furnished with preparations, and the means of procuring recent subjects for demonstration: on Botany, a hortus siccus, plates or drawings, and the means of procuring fresh specimens: on Midwifery, a museum and such an appointment in a public midwifery institution as may enable him to

give his pupils practical instructions.

6. That the Lecturer on *the Principles and Practice of Medicine* must be, if he lectures in London, or within seven miles thereof, a Fellow, Candidate, or Licentiate of the Royal College of Physicians of London: and if he lectures beyond seven miles from London, and should not be thus qualified, he must be a Graduated Doctor of Medicine of a British University of four years standing, (unless previously to his graduation he had been for four years a Licentiate of this Court.)
7. That the *Lecturer on Materia Medica and Therapeutics* must be a Fellow, Candidate, or Licentiate of the Royal College of Physicians of London, a Graduated Doctor of Medicine of a British University of four years standing, (unless previously to his graduation he had been for the same length of time a Licentiate of this Court) or he must be a Licentiate of this Court of four years standing.
8. That the Lecturer on *Anatomy and Physiology* must either be recognised by the Royal College of Surgeons, of London, or must be a member of that College of four years standing.
9. That the *Demonstrator of Anatomy* must either be recognized by the Royal College of Surgeons of London, or must be a Member of that College.

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We give the Court of Examiners all credit for good intentions in the curricula which they issue, from time to time, for the guidance of the aspirants in medicine; but we confess that one or two of the foregoing regulations appear to us to indicate a strong disposition in the Court to assume unlimited power over the teachers as well as the pupils. Lecturers of 20 years standing, must now, in fact, present themselves at Apothecaries' Hall (by the 4th section) and convince the Court of their capacity to teach. Dr. Clutterbuck, Dr. Agar, Dr. Hue, Dr. Chambers, &c. must all repair to the Hall! In the 5th Section, there is a range given for every species of tyranny and oppression if the Court were that way inclined, in consequence of the indefinite terms used. Thus, in chemistry, the laboratory must have a *competent* apparatus. The anatomist must have a *sufficiently* well furnished museum, and so on. Now it is clear that the mere opinion, the caprice, or even the prejudice of that member of the Court who examines the domicile of the lecturer, may fix the *sufficiency* high or low, according to his humour that day! If laws are made, and meant to be enforced, they should be definite, and not left wide open for every interpretation which the judge choses to give them.

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## II.

### ON SMALL AND REPEATED BLEEDINGS IN HÆMOPTYSIS AND INCIPIENT PHTHISIS. By Dr. J. CHEYNE.

[Dublin Hospital Reports, Vol. V.]

THESE observations are in the form of a letter from Dr. Cheyne to Dr. Graves, and the author commences by informing us that he has often seen phthisis usher itself in without any unequivocal symptom of pulmonary affection, but apparently as "a fever of an inflammatory kind, with quick pulse, hot skin, flushed countenance, white tongue, high-coloured urine, &c." The disease might have passed for a general fever, there being no local disease prominent. Some alleviation of symptoms usually takes place, after a period of two or three weeks, and the physician promises recovery, but is deceived, as phthisis either rapidly advances, or takes a slow but fatal course.

"In the course of such attendances, the physician at last begins to feel some surprise at the continued quickness of the pulse; he fears that all cannot be right while the patient, although he eats well and walks about, does not gain strength; the breathing too is not quite natural, an occasional dry cough occurs, of which the patient seems unconscious, and emaciation is palpable. The disease has now made some progress, and another physician being called in, the case is looked at with a new eye; night perspirations are discovered; on minute inquiry hectic fever is more than suspected, and the case is pronounced to be incipient phthisis. It is in the more chronic cases to which I have alluded, that small bleedings of six ounces practised once in four or five days have sometimes apparently proved sanative."



There is a species of hæmoptysis, says Dr. Cheyne, or rather of bronchial hæmorrhage, which runs a course of two or three weeks, and which is also attended with symptoms of general fever; but in his judgment both the fever and hæmorrhage are symptomatic of incipient consumption. In these cases recovery seems to take place under antiphlogistic treatment; but the recovery is often not solid. Gradual emaciation is observable, with that ominous dry barking cough, which is often so long a solitary symptom of slowly advancing tuberculation. After some months of declining health, the disease advances more rapidly, and hectic fever concludes the sad history. "Patients of this description may sometimes be saved by timely bleedings, not exceeding six ounces every sixth or seventh day, with a regimen suited to the strumous diathesis."

"Hæmoptysis in its more common form of pulmonary apoplexy, as it is fancifully called by the French pathologists, may sometimes be successfully treated in the same way, namely, by small bleedings repeated at stated intervals. But these are topics which would require to be more carefully handled than my time at present will permit: they would best be explained, not by the hospital physician, but by him who practises extensively among the upper classes; but unhappily they who, advancing in life, obtain lucrative employment, are often obliged to forsake the favourite pursuits of their youth for occupations neither so interesting nor agreeable, and their matured experience, which often contradicts the conclusions of youthful zeal, is unproductive to all but themselves."

Dr. Cheyne next proceeds to state a case which first confirmed his opinion respecting the applicability of small bleedings to hæmoptysis. It was that of a gentleman who had long laboured under bronchial hæmorrhage, so obstinate that it resisted all the ordinary methods of treatment. Dr. C. observed that the hæmorrhage returned upon excitement of any kind taking place. Even the flurry produced by the Doctor's carriage coming up to the door invariably caused a slight hæmoptoic attack. This suggested the employment of small artificial bleedings. The case is detailed by the patient himself, who is a clergyman. These details we shall abridge.

When about the age of 15 (in the year 1807) the hæmoptysis commenced, and continued annually from that time till 1823, in which year the attack was so serious that change of air was recommended, and he went to Nice, and ultimately on to Rome. At Rome, and afterwards at Geneva, the bleeding continued, though he had the skilful attendance of Dr. Clark. In November, 1824, he returned to Ireland, and in the course of the Winter, the complaint increased in frequency and extent of hæmorrhage. Emaciation was the consequence. In February, 1825, the plan of small bleedings was commenced. For some months previously he had daily at least three discharges of blood from the lungs.

"About the middle of February, immediately after an attack, six ounces of blood were taken from the arm. For three days after he had no attack, and on the fourth a slight one, after which six ounces of blood were again taken. No attack for ten days. The attacks now gradually became less and less frequent, but every week six ounces of blood were taken from the arm. In the beginning of May he went to the country, with directions to continue the stated bleedings, which he did regularly every week, using the lancet himself, and thus being enabled at once to check an attack. The blood was in-

variably much cupped and buffed; the complaint gradually subsided; health and strength slowly returned. During the whole of the ensuing Winter he was able to take exercise in the open air without suffering from cold. In the month of June, 1826, he again entered upon the duties of his profession, from which he has never since been obliged to absent himself, and with the exception of an occasional attack, which occurs generally in the Spring and Autumn, and is invariably checked by the lancet; he is now in as good health as he has ever been at any period of his life."

It is curious that till these repeated small bleedings were employed, the digestive organs were constantly deranged; but with the abatement of the hæmoptysis, the stomach began to recover its tone, and the bowels to act without opening medicine.

Of late, Dr. Cheyne has frequently prescribed venesection in the more common form of hæmoptysis, and, in some cases, with success. Unfortunately he has no notes of these cases; but some of them are distinctly in his recollection.

"In bronchial hemorrhage it is not the loss of blood which is destructive to life, but the inflammation and disorganizing process, which is caused by tubercles, of which the hemorrhage is but a symptom, and often even a means of temporary relief. And considering that not merely has the hemorrhage been checked by venesection, but the vascular irritation on which it depends, in some sort arrested, I have been led also to try small bleedings once every week or ten days, in what I conceived to be incipient phthisis, and with a degree of success which forbids the relinquishment of that practice. Among other encouraging cases, I may mention that of a young gentleman of a family which consumption had completely ravaged; he came to me last Spring with a dry barking cough, (not from cold.) There was a portion of the thorax in which respiration was inaudible, and which, on percussion, emitted scarcely any sound, and was also the seat of uneasiness; and emaciation had already commenced. This patient was relieved by these bleedings, and when I last saw him he said he was quite well, and his appearance did not contradict the assertion.

Both in hæmoptysis and in incipient phthisis, these small bleedings may be practised with safety, and often, if I mistake not, with more advantage than any other remedy in use. To acquire a just view of such cases we ought to consider them as instances of scrofula affecting the lungs, in which an inflammatory state is caused by the presence in that organ of irritating substances, as tubercles doubtless are. In phthisis, these attacks of inflammation in the tuberculated portions of the lungs precipitate disorganization. Phthisis is often, for a long time, only suspected, until uneasiness in the chest, perhaps increased frequency of the pulse, hurry of respiration, and greater debility, prove that inflammation around some clusters of tubercles is more speedily accomplishing the destiny of the patient. If the inflammation were subdued and the general health improved, perhaps it might be within the power of the absorbents to remove tubercles if still in an early stage. This view would justify the exhibition of remedies of opposite kinds. No point is better established than that the scrofulous patient is best treated by nourishing and restorative food and medicine, but there are many cases of scrofula in which we must, for a time, substitute bleeding and an antiphlogistic regimen for generous food and stimulating applications, to prevent the disorganization of a viscus, and of such cases this appears to be one.

In hæmoptysis, venesections act rather as an alterative than a styptic, mere hemorrhage from the lungs does not justify the measure. Bleeding, however, is amply justified by the existence, during hæmoptysis, of pain, hurried respiration, or any other symptom of parenchymatous or of membranous inflammation.

In cases of hæmoptysis with inflammatory symptoms, venesection may be necessary during the attack, but generally tartar emetic in nauseating doses, given every hour, or every two hours, proves a more powerful styptic: one-third or one-fourth of a grain of tartar-emetic in a draught containing also ten or fifteen grains of nitre, a combination which is often powerfully diuretic, will be still more efficacious. But if respiration be natural, and there be no cough, stricture, or pain in the thorax, the case will be better treated by small doses of opium, two or three grains of Dover's powder, for instance, every two or three hours; to minute doses of opium may be added, a couple of grains of superacetate of lead or a dose of Ruspini's styptic.

Finally, small bleedings, practised in incipient phthisis, *enable the physician more safely to enlarge the patient's diet, and to prescribe tonics, such as Griffith's mixture or Heberden's ink.* The treatment which I would recommend in incipient phthisis may be stated in a few lines. Journeying, if practicable, or what is better still, in fine weather going from shore to shore in the steamers, short residences at Mallow, or the Cove of Cork, or some favourite spot in England, or, during the Summer, in Scotland. Diet as generous as the state of the lungs will permit, in some cases a glass or two of claret, and small bleedings. Sponging the chest and arms with very dilute nitro-muriatic acid, or with five parts of Mindererus's spirit, and one of spirit of rosemary: an issue over the most suspected portion of the lungs, or a succession of blisters, after each bleeding, not much larger than a dollar. A light bitter two or three times a day, with twenty or thirty drops of laurel water, or the nitro-muriatic acid internally, or perhaps some preparation of iron. If I had time I would explain my reasons for rarely sending patients, in any stage of consumption, to the continent of Europe."

Whatever may be Dr. Cheyne's reasons for this resolution, there is reason in it. We too are of the same opinion, and our reasons will be before the public by the time this Number sees the light.*

* See Dr. Johnson on "CHANGE OF AIR," Part the Third, on the "Moral, Physical, and Medicinal Effects of an Italian Climate."



## III.

### HOTEL DIEU.

PARACENTESIS THORACIS FOR HYDROTHORAX AFTER PLEURISY. Reported by M. SOLON.

IF we can trust to medical records, the operation of paracentesis thoracis for serous effusion, has often been performed with success; and yet it is seldom practised at the present day. This is no doubt owing to the fact that hydrothorax is rarely unattended, or rather unproduced by organic disease of the heart or lungs, rendering the operation of drawing off the fluid from the bags of the pleura of little or no avail. Still the distress experienced by the unhappy sufferers is such, that even a temporary relief would often be a great blessing. The only cases where the operation is likely to be of any permanent benefit, are those where severe pleuritis has terminated in considerable effusion, menacing the life of the patient, but where there has been no antecedent organic disease. It is to be borne in mind, however, that immense quantities of effused fluid will be absorbed where the organs are sound. The reporter of the case before us cites a remarkable illustration. M. B. after exposure to severe cold became affected with very acute pleuritis. Venesection and leeching moderated the inflammation, but did not prevent effusion into the left side. This went to such an extent, that the heart was pushed over into the right of the thorax. Nevertheless the one lung sufficed for respiration, and the patient did not suffer much. Moxas and blisters were repeatedly employed, and at length the reserption was complete. Both sides of the thorax became sonorous and of the same dimensions. We shall now proceed to the case which was operated on at the HÔTEL DIEU.

B. aged 18 years, a painter, was exposed to rain after being much heated, on the 18th September, 1830. The consequence was, a rigor, followed by

high fever and the usual symptoms of internal inflammation, exasperated by wine and improper diet. He was brought to the Hôtel Dieu on the 27th September, presenting well-marked symptoms of intense catarrhal fever, complicated with those of gastro-enteritis. Nevertheless the thorax sounded well in all parts, while the rale muqueux and rale sibilant shewed inflammation as still existing. The usual depletory measures were put in force; but they did not well succeed, for on the 22d of October he presented renewed febrile symptoms, with cough, and œgophony near the inferior angle of the left scapula. The œgophony continued to extend, and the sound of that side of the chest to become more and more obscure, till the respiratory sound was quite inaudible, and the ribs of that side immoveable in the act of breathing. The respiration in fine became so much embarrassed, that life was menaced if an operation was not performed. A consultation was held, and paracentesis thoracis was determined on. The incision was made at the most prominent part, which was between the seventh and eighth ribs, and when the stilette was removed clear water issued in a full stream. When about a pint of fluid was withdrawn, the man said he could breath freer, and when another half pint was evacuated, the tube was taken out of the wound, which was carefully closed by diachylon. The man was placed in bed, and felt better in all respects; but when the thorax was percussed, it was found that the fluid still rose nearly up to the clavicle. He spent a very bad night and became delirious, the respiration more laborious, and died the next day.

On dissection, from four to five pints of clear water were found in the cavity of the pleura, which membrane was every where coated with a dense but vascular layer of organized coagulable lymph. The left lung was reduced to a very small compass, and quite impermeable by air. The right lung was sound, and very voluminous. The bronchia were red, and their lining membrane thickened. There were marks of acute inflammation in some portions of the mucous membrane of the intestines.—JOURN. HEBDOMAD.

The foregoing case is not very encouraging for the operation in question. Probably had it been performed at an earlier period, and more of the fluid drawn off in the first instance, the relief would have been greater, if not more lasting.

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## IV.

### GUY'S HOSPITAL.

### Hoo Loo.

THIS unfortunate inhabitant of the celestial empire traversed many thousand leagues of ocean to lay his bones in a foreign clime! It was well observed by the poet of Nature that, it may sometimes be better to bear those ills we have, than fly to others that we know not of. We were quite convinced, and we mentioned our conviction to more than one person, before the operation, that no human being, and least of all an Asiatic, would survive the removal of such a tumour as *Hoo Loo* presented. Nothing could exceed the dexterity and intrepidity with which this terrible operation was performed by Mr. Key—except the fortitude, patience, and heroic courage with which it was borne by the unfortunate Chinese! The melancholy result of the operation has not, of course, altered the opinion which we formed previously to its performance. The farinaceous diet and the phlegmatic temperament of an Asiatic, control, no doubt, the range of inflammation that must supervene on wounds or operations; but the same circumstances limit his power of withstanding the pain of incisions, and the exhaustion of hæmorrhage. The fact, too, of the genital organs being included in the morbid growth, was a fearful and formidable barrier to the success of the operation. The event shewed, and it was doubtless anticipated by the surgeons, that these organs must be sacrificed in the removal of the tumour. It is true that a somewhat similar operation was



performed, with a fortunate result, by M. Delpech, as recorded in a former Number of this Journal; but we do not think that the English surgeon had half the chance of success which encouraged the able Professor of Montpellier. It is with deep regret that we put on record the following concise narrative of this terrible operation.

"The face of the patient was then covered, and Mr. Key, taking his station in front of the tumour, commenced the operation. His object, apparently was to make three flaps, of such a form and extent, as would cover the penis and the testes when they should be relieved from the tumour. The first flap was made on the anterior part of the tumour; the others on either side. The former of these would have covered the penis, and the two others (which were made semilunar in figure with the convexities looking outwards) would have accomplished the purpose, when united, of enveloping the testes, and at the same time of forming the integument of the perineum. The first incision was commenced on the right side, just under the abdominal ring, and being carried obliquely inwards for about an inch, was continued so as to form the semilunar cut, from the lowermost point of which, the knife was again carried inwards, in order, apparently, to leave such a small projection of integument as, with a corresponding piece on the opposite side, might serve to go round the root of the penis. This portion having been reserved, the incision was continued onwards for about four inches in a straight line, and was then turned at a right angle, parallel with the operator, forming a line of about two and a half inches in length. A similar cut was then made on the left side, and connected with that on the right by the parallel or transverse cut. The flap thus formed was now dissected from the tumour and laid back upon the abdomen. The operator then proceeded to lay bare the two cords and the penis, a step in the operation which was performed with very great neatness. Sufficient time had now elapsed for the depressing effects of the operation to exhibit themselves, while the penis and testicles had yet to be dissected out. The determination to attempt this arose from its having been ascertained that the sexual inclinations of the man were unimpaired, seminal emissions being occasionally experienced. The delay, however, which so intricate a portion of the operation would have occasioned, now induced Sir Astley Cooper to propose that the genital organs should be sacrificed, and the suggestion was promptly acceded to. A temporary ligature was accordingly passed round each of the cords and the penis, and these being divided, the remainder of the operation was pursued solely with a view to the removal of the whole mass. But a period of time elapsed before the conclusion of the operation which must have far exceeded the anticipations even of the most fearful, and by the time the tumour was entirely separated and the exposed parts were closed over, an hour and forty-four minutes had passed. This tremendous protraction was chiefly occasioned by the intervals which were from time to time allowed the patient for recovery from the fits of exhaustion which supervened. Complete syncope occurred twice, and during the whole of the latter steps of the operation he was in a state of fainting. The quantity of blood lost was variously estimated by those who assisted, and though certainly not large, it was the operator's own impression that the hæmorrhage was the immediate cause of death. It would probably be correct to state the loss at twenty-five ounces, although as few as 14 and as many as 30 were named. Of this quantity not more, we should think, than a single ounce was arterial; all the ligatures were quickly applied, and with great dexterity. The number of large veins divided was immense, but only three small arteries, besides the two spermatic, were taken up. Immediately after the removal of the tumour, another fit of syncope—if syncope could be said to be at all incomplete for the last half hour—came on, from which the poor fellow did not for a moment rally. No remedies that were directed to overcome this state of collapse had the slightest effect; warmth and fric-

tion of the extremities, warmth to the scrobiculis cordis, the injection of brandy and water into the stomach, and, ultimately, from the suspicion that the loss of blood had been too great, transfusion to the amount of six ounces, taken from the arm of a student—one amongst several who offered to afford blood—were amongst the means resorted to. The heart's action gradually and perceptibly sunk. The patient did breathe after the operation, but that is as much as can be said. Artificial respiration was subsequently, but vainly attempted."*

The tumour weighed 65 pounds when removed, and it appears to have been elephantiasis. Hoo Loo's health and strength seem to have been very little impaired by the enormous growth—a circumstance that adds to our regret that any attempt should have been made to remove it.

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## V.

### ON THE EFFECTS PRODUCED BY POSTURE, ON THE FREQUENCY AND CHARACTER OF THE PULSE, IN HEALTH AND IN DISEASE. By ROBERT J. GRAVES, M.D.

[Dublin Hospital Reports, Vol. V.]

THE influence of posture on the pulse has long been acknowledged; but hitherto not sufficiently investigated. Dr. Graves, therefore, has laudably dedicated a portion of his time and attention to the subject, and the paper now before us is the result.

"In healthy persons the pulse in the erect posture is more frequent than in the horizontal, by from six to fifteen beats in the minute. If the pulse is but sixty the difference is generally not more than six or eight, and this difference increases with the frequency of the pulse at the time of the experiment: thus if it has been raised to 90 or 100 by moderate exercise, it is not unusual to find the difference twenty or thirty.

As the muscular exertion necessary to keep the body in the erect posture, might be considered as the cause of this greater frequency, it became necessary to contrive means of placing the body in any desired posture, without the necessity of muscular exertion on the part of the subject of the experiment; this was effected, and it was found that when the posture was changed by means of such a contrivance the difference between the frequency in the horizontal and the erect postures, was not less than when muscular exertion was used.

I now anticipated, that if the body was placed with the head down and the feet up, a still further retardation of the pulse would be produced; it was, indeed, natural to conclude from the preceding experiments, that posture alone was the cause of the retardation observed in the body when placed horizontally, and consequently, that this effect would be augmented on still more depressing the head, and that the maximum of retardation would occur in the inverted position."

Here, however, experience did not confirm preconceived theory, for no retardation of the pulse was occasioned, nor yet acceleration. In the inverted position, the strength of the pulse was diminished, and often very considerably—a fact that may be explained by the weight of the blood pressing on the aortic valves, and thus necessarily opposing an unusual impediment to its egress from the left ventricle. The pulse is stronger in the horizontal than in the erect posture—consequently its maximum of strength and minimum of frequency are attained together. This, our author thinks, may account for the relief obtained by placing patients in the horizontal posture, in order to avoid syncope. In all other diseases in which Dr. G. has investigated this subject, he has found the difference between the frequency of the pulse in the erect, sitting, and horizontal postures; "*but in six cases of hypertrophy with dilatation of the heart, no such difference was perceptible, although all these patients, at the time of my making the experiment, were in a debilitated state*, which, it will just now appear is that in which the changes induced by position are the most remarkable." In four of these cases, the existence of hypertrophy with dilatation has been ascertained by post-mortem examination; and of the other two, there can be no doubt of the state of the heart in one of them—while in the other, hypertrophy is more than probable. The following are the results of a great number of observations, made both in hospital and in private practice, upon the effect of posture on the pulse in various diseases.

"1st. That the greatest difference occurs in patients labouring under fever, or in a debilitated state in consequence of fever or any other cause. It may amount to 30, 40, or even 50, between the horizontal and erect postures.

2dly. That this difference decreases after the first quarter of an hour in most cases, but always remains considerable, as long as the same position is observed.

3dly. That in persons not much debilitated the difference is much less than that stated above, and often does not amount to more than 10.

4thly. That when the patient lies down, the pulse rapidly falls to its former standard.

5thly. That in some the increase in frequency is greater between the horizontal and sitting posture, than between the latter and the erect; while in others the contrary takes place, so that generally the frequency in the sitting posture may be taken as a *mean*.

6thly. In persons convalescent from fever or acute diseases, I find it is extremely useful to the physician to ascertain the comparative frequency of the pulse in the horizontal and in the erect position. The greater the difference, the greater is the debility of the patient, *and consequently the more guarded must his medical attendant be in allowing him to sit up for any length of time*, particularly if the pulse on his lying down does not resume its usual degree of frequency."

Our author cannot conceive any plausible reason for this effect of posture on the pulse. Dr. Thomson, in his work on inflammation, adverts to this subject, and seems to have made a great many experiments to that effect.

* Lancet, No. 398.

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## VI.

### WORCESTER INFIRMARY.

#### RAPIDLY FATAL STRANGULATED HERNIA.

*Case.* John Hall, æt. 35, a healthy-looking labourer, admitted at 6, a. m. Sept. 14th, 1830, with very large strangulated scrotal hernia, very tense, and somewhat discoloured at the lower part. The tumour and the abdomen were very tender to the touch—pulse 100—slight hiccup—no vomiting since the previous evening. He had had a rupture for some time but never worn a truss; it had descended at 5, p. m. on the preceding evening, whilst heaving a heavy ladder. He was seen by a surgeon at 11, p. m. and the taxis tried for two hours without effect. He had had one evacuation since the descent of the rupture.

At 10, a. m. the operation was performed by Mr. Pierpoint, the pulse being 150, the countenance very pale. On cutting through the integuments they were found to be gangrenous, and an immense quantity of intestine, of very dark colour, was found in the sac. The stricture was relieved, but the intestines could not be returned, and an incision was made into their lower part to evacuate their contents, and 1½ (qy. lb.) of grumous blood pressed out. The cut portion of intestine was secured by a ligature, and the integuments brought over it. There was much bloody fluid in the sac. The patient sank, and died at 2, p. m.

*Sectio Cadaveris.* The whole ileum was contained in the sac, and seemed as if tied by a ligature at the strictured part. The intestine was in a gangrenous state; four yards and two inches of it were contained in the sac. The peritoneum and intestine in the abdomen were highly inflamed.

Can we wonder at the rapidity with

which gangrene was induced in so large a mass of intestine, or, being induced, at the rapidity with which it proved fatal? In such a case the operation cannot be performed too early, the taxis cannot be employed too little.

GUNSHOT-WOUND OF THE SCALP.

*Case.* Samuel Crook, æt. 27, was admitted August 18th, 1830, with severe gunshot wound of the head, situated over the left orbital process of the frontal bone, an inch in breadth, and two in length; the eye a good deal swollen and inflamed; a portion of the integuments and pericranium was carried away. The accident had been occasioned by a gun having gone off when he was drawing its charge. Leeches and a poultice were applied to the wound, the sloughs came away, and healthy granulations succeeded. On the 10th day there was shivering, succeeded by heat and sweating, vomiting, tongue loaded, brown and dry, and pain in the head. Blood was taken freely "from the head," and the patient purged with calomel and jalap. The wound suppurated, the symptoms grew worse, there came on paralysis of the right side, blindness of the right eye, tremors. On the 15th day from the occurrence of the accident, the trephine was applied over the denuded bone, and two circular pieces taken out, when half an ounce of fetid pus escaped, and a portion of dura mater was found to be sloughy. Immediately after the operation he moved his right arm and seemed to breathe more freely. He gradually sank, however, and died at 11, p. m.

*Sectio Cadaveris.* The whole of the left hemisphere of the brain was covered with pus, of which there was much also at the base, in the depression occupied by the middle lobe of the cerebrum; the pus extended down into the orbit, (which?) A portion of dura mater was sloughy, and adherent to the cerebrum to the extent of a shilling. The left hemisphere of the cerebrum was very much inflamed. No increased quantity of fluid in the ventricles.

We suppose from the context that the pus extended into the *left* orbit, but the case is loosely worded. The blindness was of the *right* eye, and, if the matter was in the other orbit, depended on the pus at the basis of the brain on the opposite side. It is rather singular that the presence of the matter in the left orbit produced no symptoms nor disturbance of the functions of that eye. Of late years, since the treatment of injuries of the head has been better understood and more scientifically practised: since, in fact, depletion has been generally employed in the early stages, the instances of secondary formation of matter on or under the dura mater have been comparatively rare. The present case adds another to the long list of failures from the use of the trephine for these secondary symptoms. From what we have seen of its employment in these cases, we should say that the unexperienced readers of Mr. Pott's works, would form a very erroneous opinion of its success. We have never seen it beneficial, although we are aware that it occasionally is so. Prevention by strict antiphlogistic regimen and depletion, is the grand point to be attended to.

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VII.

CASES OF IDIOPATHIC GLOSSITIS. By MR. ORGILL.

CASES of this kind are certainly not common, and when they occur they deserve notice. Mr. Orgill has briefly published the particulars of three in our Glasgow contemporary for February of the present year.

*Case* 1. A farmer, aged 50, complained of much difficulty of deglutition, for which some common remedies were prescribed, and a week afterwards presented himself to Mr. Orgill. The left half of the tongue was so much swollen as to prevent articulation and deglutition; the right half was natural; the pulse was natural. Six ounces of blood were abstracted by leeches and a cupping-glass, applied to the root of the tongue externally, but this gave little relief, and Mr. Orgill introduced a scalpel flat on the dorsum of the tongue, and made two incisions half an inch deep, from as far as the instrument reached to the tip. The incisions bled pretty freely, and the swelling was a good deal reduced, but in the evening it was become as great as ever. It was scarified still more deeply, and a castor-oil enema prescribed. This also gave great relief for a season, but next morning the swelling had returned, with a peculiar lividity at the tip of the diseased half of the organ. An incision an inch deep was made with a scalpel, a gush of most offensive pus ensued, and in eight days the tongue was well. The sensibility on the affected side continued impaired for a year afterwards, but then it was gradually restored.

*Case* 2. A sailor, æt. 35, after languor and some rigor, complained of difficulty of deglutition, and next day the left half of the tongue was swollen to three times its natural bulk, and very painful. Its surface was foul, except at tip, which was very clean and red; the median line abruptly bounded the enlargement. There was much difficulty of articulation and deglutition, with fever. *V. S. ad* ℥xx.—*brisk purgative.* Next day the tumefaction and pain seemed again to be on the increase. *Five leeches to the tongue—cathartic repeated.* The disease rapidly abated, and on the fourth day the organ was perfectly healthy.

*Case* 3. A woman applied to Mr. Orgill with inflammation of the whole tongue, terminating in suppuration of the right half. She was relieved by scarifications, discharge of the pus, and cathartics. Some months afterwards she was attacked with the same complaint, and there was here a peculiar lividity and smoothness at the tip, on the side which suppurated.

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VIII.

FUNGUS HÆMATODES OF THE THIGH, SAID TO BE CURED BY AMPUTATION.

IN the same number of the Glasgow Journal is related a case of this description. A lad, about 23 years old, applied to Mr. M'Dowall in September 1829, with a soft swelling of the thigh from the knee to near the groin; it looked like deep-seated abscess, was punctured, but only a white fatty substance and a little blood escaped. The disease had commenced nine years previously in the form of abscess which had broken and discharged much matter. From the opening now made in the integuments, a large white fungous tumour appeared, and continued to advance. The opening being enlarged it soon attained a considerable bulk, looking like a large melon, and blood beginning to ooze from it, as if pressed from a sponge. The bleeding was troublesome, and the top began to mortify, so the tumour was removed down to the thigh-bone, and was found to penetrate deeply. The tumour, when cut into, looked soft and pulpy like brain. There was much loss of blood in the operation, and the patient grew rather collapsed. The wound appeared to be doing well, and so did the boy, but five fungous tumours soon began to appear through the wound. Every day they enlarged, and now a sharp point of bone was felt just over the head of the fibula, separate from the inside of the thigh-bone; it was removed, and another large fungous tumour, bleeding profusely, began to advance. The patient went on in a most miserable way, till the 10th December, when amputation of the thigh was performed, about four inches below the trochanter major. The health after this improved, and on the 10th April, 1830, Mr. M'Dowall met him on the road.

On examining the limb it was found that the piece of bone, measuring five inches in length, which was cut out near the head of the fibula, had been detached from the femur, and had left

the cavity of that bone open to the marrow. From this opening the fungus hæmatodes had proceeded. The whole of the muscles near the knee-joint were altered in texture, and the inner side of the femur was carious for some distance above the knee.

The operation was performed in December 1829, the young man was seen well in April 1830, and the case is dated December 1830. Now if it was really one of fungus hæmatodes, and it looks extremely like it, we contend that Mr. M'Dowall is hardly justified in pronouncing that amputation has effected a cure. It is notorious that patients do often recover after operations for scirrhus and fungus hæmatodes when their situation seemed utterly desperate. They recover for a time, but seldom does this deceptive benefit prove permanent. After a variable period, it may be months or even a few years, the disease returns in the situation of the wound, in the stump, or in some other organ, cuts off the patient, and gives the lie to the chronicler of cures. The profession in general are not sufficiently aware of this circumstance, and it is only the surgeons connected with large hospitals who have an opportunity of ascertaining the results of these operations. We must hold up our hands against the system of publishing such results as determined, before a sufficient length of time can have elapsed to fix the seal of truth upon the narrative. It is a system fraught with error and delusion, calculated to mislead those who have not extensive experience of their own, entailing on the world unnecessary, cruel, and fatal operations, and offering an obstacle of the most insuperable kind to the progress of medical science. We repeat that we hold up our hands against it, and shall visit with unsparing criticism whatever instances of this most serious fault may fall beneath our notice.

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## IX.

### POISONING BY CANTHARIDES.*

A young woman serving in a dram shop administered some lytta in raspberry brandy to two young men, each of them taking half a pint of the liquor in question. One of them soon afterwards set out for Stourport, six miles distant, but was seized on the road with violent pain in the stomach and bowels, which compelled him to sit down frequently, insomuch that he was six hours in reaching the place in question. Mr. Williams of Bewdley was summoned, and found him suffering from violent pain in the stomach, bowels, kidneys, and bladder; a constant desire to make water; and a burning heat in the throat. Vomiting was produced by a mixture of sugar, water, and sweet oil, and afterwards he was ordered to drink freely of linseed tea.

At 4, a. m. next morning the skin was very hot, the sense of burning in the throat more urgent, the straining to make water incessant, whilst only a few drops of blood were voided, the pulse 100, the tongue thickly coated. *V. S. ad* ℥xij.—*Enema, ol. ric.* ℥iss. At noon the strangury continued, with much tenderness in the region of the kidneys, ureters, and bladder; bowels opened; pulse 100. *V. S. ad* ℥xiv.—*Rep. ol. ric. et enemata. Linseed tea and barley water.* At 5, p. m. the tenderness was much increased; pulse 115; great restlessness, with occasional delirium. *V. S. ad* ℥xvj.—*Ol. ric. et enemata.* 12, p. m. Restlessness very great; constant delirium with some slight convulsion; face much flushed and conjunctivæ injected; strangury distressing; pulse 125, hard and incompressible. He was bled to ℥xxiv., kept in a state of syncope for nearly an hour, then allowed to lie down, and eight drops of laudanum in some linseed tea were given him. After this the urgent symptoms ceased, though the urine continued somewhat bloody, and

* Midland Reporter, No. XI.



the tongue peculiarly coated till the 6th or 7th of July. The patient was then convalescent.

We need not give the particulars of the other case, as the symptoms were similar to those of the last, and the same kind of treatment, though not so active, proved successful.

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## X.

### INFLATION FOR COLIC.

Mr. JOHN KING, of Irvine, has promulgated a sovereign remedy for the colic in the last number of our contemporary of Glasgow. It is inflation or blowing up of the intestines, per anum. He conceives that it was a happy thought of those who hit upon this remedy in the hour of danger, after all their other efforts had proved nugatory. "It *paralyses*, as it were, the constricted fibres of the bowels, and may be used in the following cases, if not with complete success, at least with advantage, viz. the various kinds of colic, proceeding from torpidity, spasmodic constriction, viscid meconium in new-born infants, impaction, bezoards and other intestinal concretions, volvulus or intussusceptio, and some cases of *hernia*." ! This is a very encouraging list, very encouraging indeed. Mr. King relates a case in which inflation proved successful, but we need not do more than allude to it. He secured the bladder of a glyster-bag to the nozzle of the bellows, introduced the pipe into the rectum, and puffed away with the best possible effects. Mr. King conjectures that inflation would have been beneficial in some other cases, but he gives the particulars of no more. He regrets that the remedy should have fallen into disuse; had it been a good one it probably would not have done so. We do not ourselves perceive the advantages of air over fluid as an injection, and many individuals with colic would rather let air out than take it in. We say nothing of the *spectacle* of a learned physician puffing up a person's anus with a pair of bellows. The remedy may be one of great importance for any thing we know to the contrary.

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## XI.

### CURIOUS TUMOUR ATTACHED TO THE PSOAS MUSCLE. By Mr. WALDRON, Bath.

ON Nov. 12th, 1829, Mr. W. visited Lieut. H. æt. 38. He complained of constant pain and uneasiness referred to the back, and tenderness on pressure of the third lumbar vertebra; the aspect was sallow, the bowels irregular. Leeches and purgatives were prescribed. On the 15th, Mr. W., finding the patient could only lie on the left side with the knees bent, examined the abdomen and found a fulness in the course of the sigmoid flexure of the colon. He considered the case one of fæcal accumulations, and used means adapted to their removal, but without benefitting the symptoms. On the 17th the patient looked very ill, and Mr. W. again examined the abdomen, and thought he felt fluctuation in the fulness. The Lieut. said that he had suffered for several years from pain in the back and loins, that it had been growing worse for some months, and especially so within the last six or eight weeks. We need scarcely mention the treatment employed, as it did no good, and on the 24th Dr. Bowie met Mr. Waldron in consultation. On the 28th the consultants came to the conclusion that the case was one of psoas abscess, as the tumour dilated on coughing, and receded considerably when he lay upon his back. The patient sank rapidly and died on the 30th.

*Sectio Cadaveris.* "On the left side a fulness was visible, extending from the anterior and superior crista of the ilium, to the inner edge of Poupart's ligament, and there terminating with a slight bulge. Upon manual examination after death, a very indistinct fluctuation could be felt. On making an angular incision from the symphysis of the pubis, extending to the right and left ilium, a quantity of serous fluid es-

caped; on the left side, upon cutting through the parietes of the abdomen, and turning them back, the peritoneal covering of the left side was closely united, and could not be detached from a dark-coloured tumour which was now partially displayed to view. It appeared to occupy the greater part of the left side of the pelvis; from the close adhesions which had formed between this diseased mass, its peritoneal covering, the colon, rectum, and kidney of the left side, very considerable difficulty was experienced in its dissection, and by no means could it be satisfactorily effected. I first separated and secured by ligature, the large arch of the colon, above where the diseased structure commenced, in two places, and having then divided it, I proceeded to trace the sigmoid flexure downwards, but this I found impossible. The colon throughout, commencing from its sigmoid flexure, was embedded in an encysted tumour, of a dark colour, and when cut into and examined, evidently consisted of coagulated venous blood; the colon and rectum were so closely embedded in, and united to, this diseased mass, that they could not be separated from it; and appendiculæ pinguedinosæ throughout the whole course of the colon, even to some distance above the tumour, extending to its large arch, resembled so many black grapes, and when cut into, were found filled with dark-coloured venous blood. These bodies were found so closely adhering to the tumour, that it was impossible to separate them from it. The tumour was situated on, and adhering to, the psoas magnus muscle, extending to, and enveloping the left kidney, and appearing to take the course of the mesentery, filling up the loose fold which retains the sigmoid flexure of the colon, and passing downwards as far as the mesentery extends towards the rectum. It would appear that the mesentery thickened and condensed by chronic inflammation, formed a capsule for the tumour. The colon and rectum, when cut into and laid open, appeared healthy within. The whole of the intestines were highly vascular, and bore marks of inflammatory action, but more especially the large ones. The liver was of a light grey colour; the left kidney was very much diminished in size, and was surrounded by a yellowish substance, similar to pus. The spleen was of a light grey colour. A very considerable quantity of fluid was found in the abdomen, which, during the attempts made at dissecting out the tumour, became mixed with the coagulated blood, and added greatly to the difficulty in making a clear and satisfactory display of the parts, and rendered it impossible to discover the source of hæmorrhage."

We have seen the same sort of bloody tumour surrounding one kidney. It was like the contents of an aneurismal sac, consisting of dark coagulum in some places, yellowish lamellated coagulum in others. It was of great size, yet the vessel from which the bleeding had occurred eluded our detection. Of the symptoms during life we are ignorant. We suppose that if the tumour, in Mr. Waldron's case, had been of the hæmatoid character he would have recognized it as such.

## XII.

### ABSORPTION OF THE IRIS.

A BOY received a blow upon the eye with a piece of metal, lacerating the iris, and followed by considerable pain and inflammation. For a time the pupil was cordiform, being pointed at its lower part, but slowly, and without pain, the whole iris was absorbed, and the eye became amaurotic. Mr. Middlemore has several times observed laceration of the iris followed by partial, in one instance by its total absorption. In every case the injured eye became amaurotic.—*Mid. Report.* No. XI.

## XIII.

### GROWTH FROM THE CILIARY LIGAMENT.

A CHILD, æt. 10, was struck upon the eye with the closed hand, without occasioning any evident inflammation afterwards. In about a week a small reddish tumour formed in the anterior chamber at the anterior side of the eye, appearing to be attached only to the ciliary ligament. It soon became as large as half a small pea, was convex anteriorly, extended nearly across the pupil, the circularity of which remained, occasioned no pain nor inflammation, and neither impeded the motions of the iris, nor changed its colour. Under the influence of mercury the tumour gradually became absorbed, and never again returned. Did the tumour consist of organized lymph?—*Ibid.*



## XIV.

### CONGENITAL MALFORMATION OF THE CORNEA AND SCLEROTICA.

A SERVANT, æt. 22, has a small excrescence on the left eye, arising from the cornea and sclerotica, at its temporal side; its surface white, smooth, convex; in its centre a small depression from which strong black hairs arise, which incline downwards so as to hang over the lower lid; it is firm to the touch, and appears to be covered by the sclerotic conjunctiva; the surrounding cornea and sclerotica preserve their natural structure. He says that the blemish was congenital, and that the hairs began to plague him only a few years ago. The man usually calls on Mr. Middlemore once in every six weeks, in order to have the hairs removed. Mr. M. intends to apply the nitrate of silver to the cavities containing the bulbs of the largest hairs, when he next extracts them, and if this fails to dissect them out, if it can be done without danger of penetrating the globe. The hairs are of the same colour and have the same inclination as those of the lower eyelid. This is the only instance of such a congenital malformation which Mr. Middlemore has witnessed.

In a patient with hernia we remarked a deficiency of the circle of the iris at its inferior part. The pupil was of course oblong from above downwards; vision was very imperfect with that eye. The same individual had all the appearances of the blue disease, though not in an aggravated degree, so that there seemed to be a tendency to imperfection in her formation, a circumstance not uncommon.—*Ibid.*

## XV.

### EXCISION OF SCIRRHOUS RECTUM.

OUR readers are well aware that M. Lisfranc is in the habit of excising the lower extremity of the rectum for what is called in France cancer of that gut. Our readers are probably aware also, that the term in question is not restricted in that country to the same malignant class of disease, to which it is limited by us; and consequently that in many cases the operation is performed for affections not essentially malignant. This being premised, we may mention some circumstances respecting excision of the rectum, which are not undeserving of attention.

The peritoneum descends along the front of the rectum to six inches from its extremity in woman, to four inches from the same in man. By means of an ovoid incision in the skin around the anus, the rectum can readily be drawn out behind, and any kind of instrument may be applied to it; there exists a second sphincter above the first. M. Lisfranc has removed as much as three inches and a half of the rectum, and he recommends the operation whenever the fore-finger can reach beyond the upper margin of the disease, and when the cellular texture external to the gut is sound. The operator must bear in mind that the antero-posterior diameter of the perineum is generally one inch, the distance of the anus from the coccyx eighteen lines, and that between the anus and the base of the same bone two inches; that considerable portions of the rectum may be removed laterally and posteriorly without wounding the vagina in woman or

the urethra in man; and finally, that hæmorrhage may always be arrested by pressure or by ligatures. In the performance of the operation the patient is to be placed as in the lateral operation for lithotomy—two semilunar incisions are to be made around the anus—and the rectum to be insulated in its inferior extremity, drawn down by the fore-finger introduced into its cavity, and cut off by means of scissors. After the cure, the fæces are sometimes voided in the usual manner, sometimes a *bourrelet* is formed internally and takes the place of the sphincter, sometimes there is incontinence of liquid fæces, and sometimes the patient is obliged to stuff the rectum with lint. Out of nine cases of operation related by M. Lisfranc, six ended favourably, three fatally.

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## XVI.

### COMPOUND DISLOCATION OF THE OS NAVICULARE OF THE TARSUS.

MR. BRODIE in his lectures is accustomed to mention a case of dislocation of the os naviculare, which started upwards. The patient was afterwards subject to periodic pains in the course of the nerves. We are not aware that such a dislocation is mentioned by other surgeons, though no doubt it has occasionally occurred. The following case is not undeserving of notice.

A carman, ætat. 28, had his foot jammed between the curb-stone and a coach-wheel, occasioning a wound which bled freely. He was carried to a hospital in Paris. The wound extended from the tendo-achillis, below the ankle, to opposite the middle of the metatarsal bone of the great toe, whilst another wound commenced before and above the ankle, and passing forwards to join the former at an acute angle, formed along with it a flap. The wound was not deep, but a little anterior to its centre a bone projected presenting an articulating surface. There was a considerable depression on the outside of the foot, below the external malleolus; the lower part of the leg and the foot were much swollen. It was thought that there was dislocation of the astragalus, and some very forcible, indeed violent, efforts were made to reduce the bone thus supposed to be displaced, but in vain, and at length they were abandoned, and the foot enveloped in a poultice. Next morning the swelling was greater and had spread higher, and the skin in the neighbourhood of the wound threatened gangrene; the patient refused amputation. The appearances grew worse during the day, and in the evening a phlyctena existed on the posterior part of the leg. Amputation was now performed, but the patient died eight days afterwards with symptoms of pleuro-pneumonia, which dissection proved to exist. It was now discovered that the astragalus was perfectly in place, and that the depression below the external malleolus was merely a result of the swelling elsewhere. The os naviculare had been dislocated from the astragalus and cuneiform bones inwards; its external extremity, connected with the cuboid, had been fractured from behind forwards, and a small portion still remained attached by ligamentous fibres to the cuboid bone. We certainly cannot say much either for the diagnosis or the practice in this case.—*Hebdomadaire*, T. II. No. 19.

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## XVII.

### VESICO-VAGINAL FISTULA SUCCESSFULLY TREATED BY THE SUTURE.

MARIE REGGIANI, æt. 22, had laboured under a vesico-vaginal fistula since her first confinement, which had been protracted and severe; the finger could be readily passed through the fistula into the bladder. For eight months a great variety of plans were employed without success, and she repaired to M. Malagodi at Bologna, who performed the operation we are about to describe. Having placed the patient in the lithotomy-position, he introduced the fore-finger of the right hand, covered with the finger of a glove, into the fistulous opening, and bending it drew down the left border of the fistula to the orifice of the vagina; and then, with the other hand he pared off the border with a straight bistoury. The hand was changed, and the same operation repeated on the right border of the fistula. The object was now to bring the two pared edges in contact. M. Malagodi had armed each end of these ligatures with a very small curved needle, and there was a handle to which the needles might be fixed at pleasure. He then re-introduced the right index finger into the opening, and brought down its left border, and with the left hand passed a needle through it near the posterior angle of the wound. A second and third needle were passed in the same manner at equal distances from each other, and their opposite border was transfixed in the same manner, when the ligatures were tied, and the sides of the opening brought together. The patient was placed on her back in bed, a catheter kept in the bladder, and the urine allowed to flow constantly into a porringer. Until the morning of the third day the water was passed through the catheter only, but then it began to escape by the wound into the vagina. On the fourth day an examination was made by M. Malagodi, who found that the two posterior sutures remained firm, and on withdrawing them the union of the sides of the fistula was complete. The anterior ligature, on the other hand, had torn the left border of the wound, and nearly a third of the original fistula thus remained unhealed. To effect the contraction and perfect cicatrization of this, M. Malagodi touched the edges regularly with the nitrate of silver, leaving the catheter constantly in the bladder. The plan was persisted in for some weeks, and was crowned with perfect success.—*Raccoglitor Medico*, *July* 1829.

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## XVIII.

### DISTINCTION WITHOUT SEPARATION. A LETTER TO THE PRESIDENT OF THE COLLEGE OF SURGEONS ON THE PRESENT STATE OF THE PROFESSION. By JOSEPH HENRY GREEN, F.R.S. &c. &c. Octavo, pp. 48. Sewed. May, 1831.

THOSE who are acquainted with Mr. Green—or who have heard his eloquent, scientific, and philosophic lectures at the College of Surgeons, will naturally be anxious to know the opinions of such a man on the present distracted state of the profession in this country. This, at least, was the case with ourselves, and therefore the instant we received the pamphlet, we read it through attentively. Mr. Green may be considered as a LIBERAL REFORMER—but we fear his BILL will be considered *revolutionary* by the ultra-aristocracy of the profession; while it will appear not quite adequate to the wants or wishes of the democracy! Mr. Green is a profound reasoner, and his lucubrations are entitled to respectful consideration. His proposed plan of reform would, we think, be a decided improvement on the present system; and would very probably lead to improvements of a still higher character. As a distinguished ornament of that College whose cause he advocates, his proposals can hardly fail to make a strong impression on the existing rulers of the institution, though we can hardly hope that they will be disposed to adopt his suggestions to the full extent. But we shall now endeavour to lay a full account of this pamphlet before our readers.

With the following philosophic reflection the little work is opened.

"Professions, like States, seem destined to have their phases and mutations. They struggle from ignorance into light, rise through error and prejudice to their full meridian glory, decline then in the subdued splendour of forms that have no longer the inward life that produced them, and sink at last into the darkness of formulæ, dicta, and precedents, the *caput mortuum* of a creative intelligence. If we look to

the professions of Divinity and Law, (to the Sciences I mean, as distinct from the professors,) I fear it cannot but be confessed that these sister stems, which entwining with Medicine, form the great trunk of the mind of the State, have ceased, in a great measure, to push forth their leaves and blossoms, and shew at present so few signs of life and living energy, that it might be doubted whether the sap continues to arise from the common root. Without attempting to disparage the useful labours of theologians and lawyers, for we are now speaking of the *Sciences* only of Theology and Law, not of the *men*—in the *literature* of these professions, we shall, I fear, look in vain for those marks of vigour which characterise the works of our elder divines and lawyers of that golden age of our national intellect, compriséd in the reigns of Elizabeth, her immediate successors, and the Commonwealth: their teaching, preaching, writings, and works, were not the records of precedents, the amassment of mere facts, but breathe an intellectual life into all the knowledge of the age, into all its feelings, hopes and aspirations, and address themselves to the whole heart and mind of man."

Mr. Green then passes a well-merited eulogium on the medical profession for its scientific and literary attainments, its humanity, and the respectability as well as influence of its members throughout every ramification of society —through every region of the globe. But the eloquent author aptly observes that, if the medical profession is justified in claiming this rank, "it is bound to shew its credentials, and prove that its members have the desire and disposition, as far as their circumstances permit, of fulfilling and realizing the idea that animates or ought to animate their pursuits." This leads Mr. Green to a rapid retrospective glance at the origin of our medical institutions in this country—a retrospection, by the way, not over flattering to the beau-ideal character of the profession which the author had just drawn.

"If we look back into the annals of the medical profession in this country, we shall find in the charters granted to the College of Physicians, and to the Barber Surgeons, that the first attempt to its more effectual incorporation was not unpromising, and began with no inauspicious omen of future greatness. But it is no less true, that unfortunately at that time likewise were the Cadmean teeth sown, *mortalia semina dentes*, which were afterwards to start up in the armed forms of jealousy, rivalry, dissension, and separation, between the two important branches of physic and surgery. This might indeed have been prevented, had the College of Physicians acted up to their original charter; and had they continued to enforce its provisions, the right and duty of practising surgery being vested in them, the present College of Surgeons, or its humbler predecessor, the Corporation of Surgeons, would not probably have existed. And although it cannot be doubted that, sooner or later, the functions of the surgeon and physician, (at least in all large towns,) would have been exercised by different individuals, yet the well-educated surgeon would have been essentially a physician, fitted to be such by his education, and by virtue of his attainments admitted as a member or fellow of the College of Physicians; and the difference in the two classes of physicians and surgeons would have been only *practical*, whilst the absurdity of a division, where it is impossible to draw a boundary line, would have been obviated: there would have been, I say, *distinction* without *separation*. There would then have been a scheme laid of ordered unity, for which the elements must have their rank assigned by a principle of co- and sub-ordination, in default of which the elements become hostile opponents. But, unfortunately, whatever the cause may have been, instead of this distinction, which not only permitted, but might have secured and perfected, a union, the College of Physicians resorted to an exclusive division from the surgeons; and we find them taking no other interest in the proceedings of the latter, than by instituting law-processes against them, or the more summary mode of vindicating their supposed



rights, by committing them to Newgate. And thus the circumstance of the distinction of function with a common object, instead of acting to fraternize and cement, became the deadly poison of jealousy and hatred."

But the surgeons, though disgraced by their fraternization with the Barbers, began gradually to rise into importance, and ultimately effected a separation from their ignoble brethren of the razor, and the establishment of a corporation for themselves. Here we have to deplore a division which weakened the profession, and seemed to erect an impassable boundary between the two great classes of medical practitioners. But this was not all. A third division or sect was soon to be created more numerous, and perhaps more powerful than both the other two—the GENERAL PRACTITIONERS. Originally only the dispensers of the physician's prescriptions, they were afterwards entrusted to administer—and ultimately to prescribe medicines. Native talent and the diffusion of knowledge have now rendered this class physicians in ordinary to the community at large.

"Their surgical functions brought them of course into connexion with the surgeons, as the surgeons in many instances arose, from very obvious causes, out of the class of general practitioners. But although thus every way connected in interest, and united in a common object with the higher branches of the profession, we find, as the advance of knowledge required a closer examination into the qualifications of the general practitioner, that in an inauspicious moment, the regulation of this department of the profession was entrusted, by Act of Parliament, to the trading company of Apothecaries, and thus a new and independent interest created in the profession. And although the society of apothecaries have, with exemplary zeal, directed their efforts to promote the better education and respectability of their members; yet it would be difficult to assign any sufficient reason for their selection to so important a trust; and we have to regret that it presents another instance of separation, where distinction without division might have been easy, and has become, like the separation of surgery from physic, another cause of disunion and weakness in the medical profession.

Thus, throughout the medical profession, in which there is essentially a community of interests and objects, instead of promoting and cementing a union of its different departments, which would have given strength to the higher, and an increase of respectability to the subordinate, their interests have been rendered independent, and conflicting, to the great danger of its stability, and with the obvious tendency of crippling its energies and of lessening its sphere of utility."

This is a melancholy, but true picture; and the learned author despairs of a remedy—"the separation of the different departments of the profession being a thing *jam consummatum*, and, for the present at least, irremediable."

Mr. Green then proceeds to investigate the origin, the intentions, and the conduct of the College of Surgeons—expressing an earnest and honest desire "to discover the foundation (if any) for those bitter complaints, and loudly-trumpetted-forth grievances, which, full of sound and fury, threaten to shake to its foundations the College of Surgeons." Mr. Green proceeds to a very recondite, and to us not always intelligible discussion into the nature of colleges, societies, or institutes, for the protection or promotion of science or the fine arts, as distinguished from corporations, guilds, and companies for the regulation of commerce, or the maintenance of rights and privileges. In the latter class of institutions our author argues that it is right and proper that a certain number out of the whole class should be elected to watch over the common interests of all, in which process, the electors can find easy and sufficient criteria in the wealth, extensive dealing, and fair character of the candidate or nominee. From the following extract, it will be seen that Mr. Green takes a very different view of scientific corporations.

"Now, if, on the other hand, we look into the history of the different

great learned or scientific colleges, academies, and institutes of civilised Europe; or if we consider the ends and purposes of their institution; we shall find that the paramount object has been to create a class not already existing, or to call forth a class existing only under the scum of such imperfections and deformations as necessarily intercepted every form of excellence that might be contained virtually therein. The purpose, I repeat, of the illustrious founders, has been to take advantage of the fortunate accidents of genius, knowledge, and attainments, which the particular age and country had presented, and so to combine these, as that they should work productively as well as influentially on the mass successively subjected to their influence, so as, in the greatest possible degree, to assimilate it to themselves. They were the ferment that was to work in the production of a given body, and not merely to be choice specimens of products already existing. The colleges of learning and science may exercise various functions, and fulfil sundry purposes, which belong to the corporations of common life; but this is their peculiar character, this is that by which they have and can alone worthily retain the name of a learned or liberal incorporation—that their characteristic object is prospective, the promotion, the advancement of the science or art, in distinction from, though, thank God, in necessary union with, the interests of scientific men, as individuals. Their characteristic mode of action is to work by descent; they are to be the suns of the system to which they belong, and not mere mirrors, reflecting only the light that had been previously bestowed; and their characteristic form, from the very beginning, is by *appointment*—appointment by a higher, in contradistinction from *election* by a supposed lower, or equal."

"Appointed thus from the highest authority, and "exercising an influence, which evermore works *descensively* till, as the product of its own subliming and assimilative action, a correspondent ascension gradually takes place, a college thus framed perfects itself into a circle, ever working *from above*, yet ever returning on itself." These are sublime images of beau-idealism in surgery, which we love to dwell on; but unfortunately we cannot shut our eyes to the realities of life around us! When we contemplate these "suns of the system to which they belong," radiating their beams of knowledge on the innumerable distant orbs of the same system in Lincoln's-Inn-fields—when we see these distant orbs "ever working from above"—and so prone to amalgamate with the "suns" of the system, that it requires talismanic wands to keep them from rushing into terrific collision—we cannot but think that the ingenious author of the brochure before us, has drawn a little upon his own fertile imagination—and portrayed that which *ought* to be, rather than that which *is*.

The able writer goes on to state that the great purpose or object of a learned body is to confer honour, to delegate authority—to give assurance to the community of competent skill—to exclude from the ranks of the profession every unworthy member. That these praise-worthy objects are all accomplished by the College of Surgeons, seems to be doubted, even by the College's own professed advocate.

"How far the college has answered the purposes for which it was intended? whether it has produced all the advantages that might have been expected? or again, whether any improvements might be suggested for its more efficient administration?—these are questions which are now to occupy us, and the answers to which are to form the results of our inquiry. That it has done much good, I cannot doubt, in producing a better educated and more efficient body of surgeons, in rendering them more anxious for professional character, and in raising them in the public estimation. But whilst the college possesses no power of preventing ignorant and unqualified persons from practising surgery; whilst men of bad character are permitted to enjoy the privilege of being associated with men of honour and respectability; and whilst advertising quacks are suffered to stand on



the list of its members, it may be doubted whether its influence is such as might be wished; nor am I prepared to say, that the examination of candidates for admission, and the lectures illustrative of the museum, in point of extent, are such as may be deemed worthy of the advanced state of science."

Mr. Green denies that these defects in the institution were the causes of dissatisfaction upon recent occasions—and he maintains that the said dissatisfaction is limited to a small fraction, or faction of the members at large.

"On the contrary, it is notorious that the loud and the turbulent, as in most cases, form but a small, and that the least respectable part of our community; and that not only has there been no complaint nor remonstrance by any number, however small, of respectable members, in respect of any mal-practice or mal-administration of the college, but it is evident from the still swelling list of members, that the candidates for general practice are anxious to obtain the college diploma, and consider it an honour and a proof of their respectability to belong to the college. *I will not, however, attempt to conceal that discontent and dissatisfaction exist, and that many of the members of the college who have not given a public expression of their feelings, perhaps from fear of being identified with persons whose motives and objects they disapprove, still sufficiently show that they are by no means cordial friends of the establishment, and evince, in various ways, their dislike and jealousy of college influence.* I believe it will be difficult to discover the nature, and trace the causes of this more or less prevalent feeling. The general practitioners feel themselves,—in consequence of their ineligibility to places of influence, and from having no voice in the affairs of the college,—under a perpetual ban of humiliating disparity, in comparison with those who practice surgery exclusively; and I apprehend that the discontented generally would, (if they could divest themselves of the sense of propriety, the absence of which characterizes the turbulent few,) *adopt the same language as the latter have done, and demand for themselves eligibility to the council, the power of electing members to the same, and the control of the application of the funds.*"

The author would gladly believe that this feeling is *not* general among the surgeon-apothecaries, since he could not ascribe it to any desire of increasing the respectability of the profession, which ought to be the aim of its members. He therefore attributes this feeling to a "spirit of restless ambition, and the delusive lust of individual power." The sum and substance (he maintains) of the defects complained of in the present constitution of the college, are the irresponsibility of the council—its powers of self-election—and "the exclusion of the surgeon-apothecaries from all control of the funds, and from places of trust, as well as from the elective franchise." In respect to the *irresponsibility* of the council, the author meets the objection by asking if the council have abused their trust, or rather their absolute power? We are rather surprised to see so sensible a writer as Mr. Green make use of so weak an argument. Is unlimited power to be confided to a monarch because he has never abused power or acted the tyrant? History surely has not been consulted in vain by Mr. Green. After vindicating the conduct of the council (and we are far from accusing them of any misconduct) the author appears to feel the weakness of the argument, and endeavours to shew, by a somewhat subtle and forensic train of reasoning, that the council is *not* irresponsible. The author shall speak for himself.

"But is the council, according to the previous assumption, really irresponsible?—So far from it that, according to the laws of England, the KING, who is the founder of all corporations, is constituted by law the visiter of the same, and he exercises this jurisdiction in the Court of King's Bench, where all misbehaviours of corporations are inquired into and redressed, and which, upon a proper complaint and application, can prevent and punish any injustice of which they may be found guilty. Thus, then, for the due administration of the affairs of the surgical profession, there do not appear to be any sufficient

grounds for removing it from the hands in which it is placed."

That our Patriot King is ever ready to attend to and redress the grievances of his subjects, we well know; but that His Majesty should take upon himself, through the medium of his "Court of King's Bench," to rectify the grievances of the members of the College of Surgeons, is rather too much for common sense! This indeed is the weakest part of the pamphlet, and much are we astonished that Mr. Green should so openly expose the weakness of his cause. Mr. Green's arguments against *universal suffrage* in the election of the council and other offices in the college, are better supported; and as this is one of the most important of all the questions discussed, we shall again allow the author to speak in propria persona.

"And I proceed, then, to the remaining question, that of the power of nomination and appointment, vested in the council, and the consequent exclusion of surgeon-apothecaries from eligibility thereto, and from any elective franchise. And although this question might be fairly dismissed, by referring to the distinction already established between scientific institutions and trading corporations, in drawing which it has been shewn, that the former can be in no other way renewed and perpetuated than by taking up, receiving, and appointing those, whose qualifications and attainments fit them to carry on the original purpose of the institution, and that the very objects and intentions of such learned bodies would be frustrated by popular elections; yet if, admitting even the principle of election, we can shew that the admission of surgeon-apothecaries to the same privileges as those members of the College who practice surgery exclusively, would be neither just nor desirable, nor even practicable; and that this must be granted by any reasonable man, or even by any general practitioner not wholly blinded by his passions,—then I presume it will be admitted, that the question respecting such a change in the constitution of the College, may be suffered to fall to the ground. Now it is plain, and so acknowledged by the public, that the surgeon-apothecary derives a large share of his respectability and of his general professional character, and receives the confidence of his patients in consequence of his being associated with, and having received the diploma of the college; and that it not only is so, but that the general practitioner feels it himself, and is proportionally anxious to make it known that his qualifications for practising surgery have been examined into and approved by the college. It would be wonderful if it were otherwise, for the testimonial of his ability is guaranteed by the signatures of those whose names are well known to the public, as men whose knowledge and judgment are the best warrants and authorities for the truth of the certificate. Substitute for the names of men eminent in character those who, however much and deservedly prized within a narrow circle, are not known to the public at large, and the diploma will become little better than waste paper, or at any rate comparatively insignificant and worthless. And surely if the end aimed at in the selection of the council be that of exalting the dignity of the profession, that end will be best attained by selecting and raising those who are most distinguished and eminent as surgeons; whereas by putting on an equality those who practice surgery exclusively, and those who make surgery a subsidiary qualification, and making the latter eligible to all plans (places) of honour and trust, the object of the institution of the college, which is that of promoting the science of surgery, and not the interests of the practitioners, will be defeated, and the college would in all probability dwindle into a trading corporation: *not to mention that I fear that, as the general practitioners are in an overwhelming proportion to the surgeons, it might not improbably happen, that the latter would be excluded altogether.* And I believe we may state it as a general truth, that by a system of equalization, the higher being brought to a level with the lower, this process of levelling would infallibly vulgarize the profession; whilst on the other hand, the more you honour that which is distinguished, the more that which is lower will be raised, partake of the honour, and derive an increase of its estimation with the public.



"I trust, however, that my meaning will not be misunderstood, as if I meant to undervalue the attainments and talents of general practitioners, since I am only speaking of their share in the profession of surgery as being necessarily lower, because forming really a subordinate part of their practice, in comparison with those who practice surgery exclusively. I cheerfully admit that the general practitioners number amongst them men most estimable in talent and character, yet they themselves will allow that the avocations and pursuits of the great body of their members, do not exactly fit them for the guardians of professional honour, and the promoters of science; and without wishing even to insinuate that those who devote themselves exclusively to surgery, are men of more integrity or more talent, yet I cannot but believe that their habits as teachers, as surgeons of hospitals, their residence in London, and intercourse with those most influential in rank and talent, render it more likely that they should take enlarged views; that they should pursue professional studies with a view to the cultivation of science, and thus liberalising the profession, free it from the petty interests of a trade; that they should be awake to the wants of the profession, and supply them without jealousy or partiality; in short, that both their habits and their local advantages best fit them for constituting the governing council of the surgical department of the profession. It does appear, therefore, that it is not without justice, nor without consulting their own best interests, as professional men, that surgeon-apothecaries are, in the *present* state of the profession, excluded from forming a part of the executive administration of the affairs of the college."

But admitting that the GENERAL PRACTITIONERS should be considered ineligible for admission into the council, it may still be argued that they ought to have a voice in the election of the pure surgeons to that high office. Allowing this elective franchise to be conferred on the members at large, Mr. Green asks who are those who would virtually exercise it? He answers—"the LONDON PRACTITIONERS, since it is impossible that the country practitioners, the surgeons of the army and navy, or those resident in our colonies, could attend the election." He contends then that the elective franchise, designed to give influence to the majority, would, in fact, "give power to the few at the expense of the many." There is certainly considerable force in this objection to universal suffrage in surgery.

"But in thus adverting to the practitioners in the country, I cannot pass over the fact, that there is a very important distinction to be made between many, or most of these, and the London practitioners. In the country, necessarily, a great deal more of surgical practice devolves upon the general practitioner than in London; and many being surgeons of county hospitals and infirmaries, and residing in large towns, like Manchester, Leeds, Birmingham, Liverpool, (names which bring to my recollection men most eminent in practice, and sedulous cultivators of their profession as a science,) there would be found amongst them most desirable acquisitions, and men who would form bright ornaments to the college council: were it not obvious, that to the availing ourselves of their services, their residence in London is an indispensable condition. On the other hand, the London general practitioners, seldom called on in pure surgical cases, or acting only in a subordinate capacity, are therefore, of the whole body, those least fitted to direct and control the interests of surgical practice and science."

But Mr. Green is not so Utopian as to expect that the above and many other arguments against popular elections and universal suffrage, will give any thing like general satisfaction to "those who desire a larger share of influence and power;"—and so far he would be disposed to go with them—"not pre-

haps in agreeing with them as to the remedy, but in deploring as an evil, in the present constitution of the College, the *want of sympathy* or communion between the members at large, and the governing body." This is, unquestionably, an evil of tremendous magnitude; for it will constantly bring, not only into public discussions, but into private life, *unceasing* enmity and hostility subversive of the respectability of the profession! Under these impressions the talented advocate of the College holds it to be a legitimate object of inquiry whether there are "any means of producing a greater confidence in the College, a closer union of its members, and a probable extension of its influence and benefits?" Mr. Green thinks it may perhaps be possible so to modify the charter, as to "satisfy the excluded, and thereby strengthen the College without interfering with the principle of its foundation." We are now prepared for the plan proposed by Mr. Green.

"1. That the government of the College should be vested in a *President*, a *Supreme Council*, and a *General Council*.

2. That the Supreme Council should consist of the President and twenty members, who should have the entire management of the affairs of the College, and the conducting of examinations.

3. That the members of the Supreme Council should appoint its own members from the General Council, and consist only of those who do not practise midwifery, nor dispense medicines.

4. That the General Council should consist of the members of the Supreme Council, and of forty additional members, twenty of whom should be under the obligation not to practise midwifery nor dispense medicines, and the remaining twenty of general practitioners —making the total number of the General Council *sixty-one*.

5. That the General Council should appoint its own members.

6. That the General Council should choose auditors of the accounts, and might suggest to the Supreme Council at their meetings any measures for the benefit of the profession. And further, that all public acts of the Supreme Council should be communicated to them.

7. That the eligibility of that class of members of the General Council, under the obligation of not practising midwifery, nor dispensing medicines, should be further determined by proofs of a longer course of study, and of superior capability, evinced by severer examinations. 1. On entering the profession, they should produce certificates at the College of having been instructed and undergone examinations in *Latin*, *Greek*, *Mathematics*, and *Logic*. 2. That they should have devoted at least *five years* to the study of their profession, and produce certificates of having attended lectures on anatomy, physiology, chemistry, materia medica, botany, practice of medicine, medical jurisprudence, comparative anatomy, midwifery, and that during that time they have attended a public hospital. 3. That they undergo three distinct examinations; the first on anatomy and physiology, the second on pathology and therapeutics, and the third on surgery: and that they write *a thesis* on a given subject, in a closed chamber, without the aid of books.

8. That there should be a class of Honorary Members of the General Council, men of distinguished merit in provincial towns, the army, navy, or colonies.

9. That general practitioners who have given up the practice of midwifery and the dispensing of medicines, should be eligible to the first class of the General Council.

10. That teachers of anatomy and surgery should not only have undergone the examinations of the first class, but should have given *public proofs* of their capability to teach by delivering a lecture, the preparation for which should not occupy more than twenty minutes.

11. That effectual means should be taken of enforcing the duties of masters to their apprentices or articled students, by a prescribed and definite course of instruction.

12. In the provisions of a new Charter, it should be imperative that



no one should be allowed to practice surgery who was not a member of the College. Since without this check upon ignorance and empiricism, it is impossible that the College can exercise one of its most important functions —that of protecting the public from the arts and practices of dishonest, unskilful, and incompetent pretenders.

13. And lastly, that the Charter should distinctly define, express, and declare, the power of expelling all those who, by dishonourable practices, have rendered themselves unworthy the character of members of a liberal profession, whether it be by the use of secret remedies, by advertizing, by partnerships in trading concerns, by calumnious reports of their professional brethren, breaches of professional confidence, or whatever else may be considered derogatory to a professional character."

We think that no unbiassed member of the medical profession can read the foregoing proposal, without conscientiously admitting that it would be a measure of incalculable benefit to the surgical profession, as compared with the present system. Much as we are disposed to raise our voice against all arbitrary power, we nevertheless most heartily approve of the concluding, or 13th article—viewing it as a kind of court of honour for punishing those numberless dishonorable and disreputable practices which could not possibly come under the cognizance of a court of law. Let us just apply the jurisdiction of such a court (which should, of course, embrace the whole 61 members) to the present moment. If the College of Physicians possessed the power, or had the inclination to exercise such a wholesome control over its members, would the vile epistle in favour of St. John Long, and vituperative of all that is respectable in the profession, ever have emanated from Ely Place? Long experience and no inconsiderable communication with all ranks of the profession, have impressed us deeply with the necessity for some COURT OF HONOUR, of the above description. We are firmly convinced that it would be of more utility than all the proposals contained in the twelve preceding articles of reform put together. But the best part of the whole pamphlet is yet to be presented to our readers.

"In addition, however, to all this, I would have the college, with a bolder zeal, promote science from its ample resources, especially by extended courses of lectures on anatomy, physiology, and pathology; on comparative anatomy, and on surgery—lectures, which might do justice to Mr. Hunter's museum, and prove worthy of the college, and of the present advanced state of science.

"Nor should I think the plan complete without the publication of *transactions*: and I would suggest that these should not only consist of voluntary contributions, but that each member of the general council should, on his admission, be obliged to furnish a paper; that they should moreover contain digested *reports* from the hospitals, both in town and in the country; and that a foreign secretary should be appointed who might correspond with the hospitals and scientific institutions for the promotion of surgery on the continent, and in America, and maintain a communication with medical men throughout the globe.

"If the college shall do all this, I think it cannot fail in healing all differences with its members, or if it have opponents, in shaming them into silence; and in raising itself in the public estimation, it will deserve the gratitude of the public and of the profession. And I do not doubt that as, in order to carry these beneficent objects into effect, a modification of the charter would be necessary, that all the respectable members, in other words, the majority and great body of the profession, would cheerfully join with the college in *petitioning* for this enlarged charter, which would secure the interests of science, the progressive improvement of the profession, and hope for all candidates for its privileges and honours.

"But if such a petition were presented to me as a minister of state, appointed to consider the provisions of such a charter, I should pause before I granted it. For I should be led to reflect on

the state of the whole medical profession, and considering its vital importance to the state, its objects and purposes, I should come to the conclusion, that however desirable it may be for its practical administration, that its departments should be distinguished, yet that from the unity of its character and purposes, they could not be divided. Instead, therefore, of any partial alteration or regulation, I should advise that ONE faculty of medicine be constituted, with such powers and administrative regulations as would render it efficient in promoting the science, and controlling the practice of medicine in all its branches, as a great interest of the state. Of this faculty, the colleges of physicians and surgeons, as representing the great leading distinctions of the profession, would naturally form the co-ordinates. In order to the admission of candidates to either, it might be required that they should have passed through the same course of study, which should be upon the most extended plan of a liberal and professional education, and that the examinations for ascertaining their proficiency, should be conducted by both; and that then from the candidate expressing his wish to enrol himself in either, as intending to devote himself practically to one or other branch pre-eminently, whether medicine or surgery, such additional proofs of competency might be required, as might shew that he was entitled to the desired privilege. And thus the practical distinction between medicine and surgery would be acknowledged, whilst their scientific unity would be preserved.

"Out of both would then naturally arise a third department, partaking of the character of each,—that of midwifery. This might have its separate board or institute, and the candidates for admission having the same basis of general education, would follow a similar rule for the enrolment of its members, by requiring a special skill and knowledge in this department of the profession.

"Next, as conjoining the functions of all three, the class of general practitioners would find its place: their institute forming a department of the faculty, which would in like manner regulate the admission of candidates, their education and qualifications, and watch over the affairs of their particular branch of the profession.

"Lastly, from the colleges or institutes of medicine, surgery, midwifery, and general practice, might be formed a medical convocation, for the purpose of deliberating on all matters relating to the profession at large. And thus a body would be constituted in the service of the state, with whom the government might consult, and to whom the country would look for advice and assistance in all matters appertaining to the health of the community, and to whom all questions relating to epidemics, laws of quarantine, the health of the army and navy, the building of hospitals and prisons, punishments, drainage, sewers, nuisances,—in fine, all questions of medical jurisprudence and police might be referred. And to a faculty of medicine so constituted, might be entrusted the government and supervision of the practical departments of the profession, and that not only should none practice medicine, surgery, or midwifery, without their sanction, but that all keepers of houses of reception for lunatics, all druggists and chemists, dentists, cuppers, should be obliged to have their licence for their several callings. And if the government would render the benefit complete and national, they would root up the detestable upas-tree of quack and patent medicines. And thus, Sir, we might at length see a profession flourishing in this country, the motto of which would be DISTINCTION *without* SEPARATION."

It will be evident that this plan does not differ very essentially from that which has been recently proposed by other medical reformers, under the title of "THE LONDON COLLEGE of MEDICINE." As being much more likely to succeed, if consented to, and assisted by the "POWERS THAT BE," we would strenuously advise a general movement in the profession to promote the measure. If there be any life or spirit in the ranks of medical society, we call upon them to unite, on this important occasion, and by a wise, temperate, but firm petition to the Colleges of Physicians and Surgeons—or even to the Legislature, endeavour to bring about such a union, such a concours, as that proposed by Mr. Green. No man is better qualified to preside over an association of the profession for this purpose, than the distinguished surgeon last-mentioned, and, if they do not call a meeting, and invite him to the chair, they deserve to remain in disunion, disgrace, and derision to the end of the chapter. A committee of physicians, surgeons, and general practitioners should be instantly formed to deliberate and act on this all-important measure. Now is the time! Let no petty jealousies distract our councils. Let the reformers who have taken the field, unite their efforts with those of more moderate, but more feasible principles, and the victory will be certain. With such a man as Mr. Green for president, the brightest ornaments of the profession, in town and country, will hasten to offer their support, and contribute, in every possible way, to the paramount object of reform. We repeat it, that the measure only wants a starting-point to insure it success. All party-feeling should be detruded from a convocation where the universal good of the profession is the end in view. We shall probably return to the subject before this number is closed.



## XIX.

### ERGOT OF RYE IN VARIOUS KINDS OF HÆMORRHAGES.

IN a former paper we gave the experience of Messrs. Spairani and Pignacea respecting ergot of rye in several uterine affections—we now proceed to state their experience in hæmorrhagic affections of different organs.

#### EPISTAXIS.

*Case* 1. A child, five years of age, was subject, for two years past, and without obvious cause, to epistaxis from the left nostril, which, however, was readily suppressed by the usual means. But sometimes the bleeding continued, more or less, for a considerable time after the principal hæmorrhage. Dr. S. prescribed eight pills, each containing four grains of the ergot of rye, and one to be taken every two hours. In a few hours the hæmorrhage ceased, and returned no more. The medicine was afterwards taken as a preservative.

*Case* 2. A young woman, aged 15 years, and who had not menstruated, was seized with gastric inflammatory fever on the 10th of August, 1829. On the 14th, in the evening, hæmorrhage took place from the left nostril, and went on to an alarming extent. This hæmorrhage was habitual; but had hitherto been easily restrained. This time it had continued 16 hours when the reporter arrived. A drachm of the ergot of rye was divided into six equal parts, one to be taken every ten minutes. The nostril was cleared of all clots of blood, and no mechanical means of arresting the hæmorrhage were used. The hæmorrhage continued during the exhibition of the medicine; and a second quantity was ordered. Immediately after the exhibition of the first dose from the second batch, the bleeding stopped. The ergot was continued through the day. During the succeeding two days some drops of blood oozed from the nostril, then stopped entirely. The fever ran its usual course—the patient recovered—and lost her habitual epistaxis.

#### HÆMOPTYSIS.

*Case* 1. A female, aged 42 years, and who had ceased to menstruate, and who was subject to pulmonic affections, consulted the narrator in the Autumn of 1828, on account of a severe cough, accompanied by sanguineous expectoration, and sometimes pure blood. There was no fever; but the pulse was hard and full—the respiration short and embarrassed. Venesection and purgation were prescribed, with rigid diet. Next day the pulse was natural; but the discharge of blood from the lungs continued. Another bleeding was ordered,

and a grain of digitalis every two hours. On the third day, the hæmoptysis continued, though the other symptoms were mitigated. A drachm of the ergot, divided into eight doses, was ordered to be taken within the 24 hours. After the fifth dose there was not a trace of blood in the expectoration. Another drachm, however, was administered, and no more hæmorrhage was seen.

*Case* 2. M. G. a young man, aged 21 years, was seized with a severe cough, accompanied by sanguinolent expectoration, in the Summer of 1828, in consequence of stripping off his clothes during a profase perspiration. Fever and palpitation were added to the other symptoms. Venesection, quietude—diluents—digitalis, &c. relieved the cough, fever, and palpitation; but the hæmoptysis continued. A drachm of the ergot was therefore administered in 24 hours, and the hæmorrhage was completely arrested. In order to prevent a relapse, another drachm was given in the course of two days. Some months afterwards there was a return of hæmorrhage, though slight in degree; and the young man sent, of his own accord, for a drachm of the ergot, which stopped the discharge.

*Case* 3. Madam N. B. 72 years of age, had suffered of late years from severe catarrhal affections. In the month of July, 1828, she had a fall, and bruised the left side of the chest; which was followed by cough and spitting of blood. She disregarded the accident, and pursued her usual regimen. The reporter was called on the 20th day after the accident, and, considering the complaint as a topical affection, ordered some leeches to the side, and prescribed low regimen. A drachm of the ergot was ordered in the 24 hours; and as she was in the habit of drinking wine, the usual quantity was allowed, in order to ascertain more correctly the effects, if any, of the medicine. In the course of the next day, the blood disappeared from the expectoration, and was no more seen.

*Case* 4. A. M. a young girl, about the age of 12, had suffered for some time from severe catarrh. On the 26th January, 1829, she expectorated blood, and more or less of this fluid continued to be ejected by coughing. Half a drachm of the ergot was directed in the 24 hours. The sanguineous expectoration nearly ceased within that time; but the medicine was continued for four days, when it ceased entirely.

HEMATURIA.

*Case* 1. Mr. C. a gentleman, about 70 years of age, was attacked by ischuria, which resisted the usual remedies, and the catheter was introduced for 20 days in succession. At this time a considerable hæmorrhage took place from the urethra, which continued and became alarming. The ergot was prescribed, and after the first dose, there was no more blood passed from the urethra.

Several other cases are related, where the ergot succeeded in restraining hæmorrhages from the lungs, the womb, the bladder, and other parts; but we think the foregoing are sufficient to excite the attention of the profession to the remedy. There is this recommendation to the article, that there appears to be no possible *objection* to its exhibition. It is not an excitant or stimulant. If it possesses any properties, they are of the *specific* class—that is—they are not under the dominion of any general rules relating to the animal economy.—TRANSACTIONS MEDICALES.

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## XX.

### MONOMANIA—PHRENOLOGY.

IN a late clinical lecture at St. Thomas's Hospital, Dr. Elliotson alluded to a curious case of monomania, which we shall here notice.

The patient was a female, 31 years of age, who had been admitted for a nervous affection, but who was soon found to be monomaniacal. The propensity was to injure some part or other of her body, by internal muscular efforts,



and not by attempts at cutting or maiming. The part of the body that fell under the monomaniacal displeasure was never long the same, but varied from hour to hour—commencing in one part whenever it had ceased in another, so that she had no respite from this harassing propensity. Her judgment on all points was good—she had no hallucination—and was conscious of the unnatural impulse which perpetually led to injure her own body. There was no reason to suspect a feigned disease. She had head-ache, drowsiness, sense of pressure on the head, as well as that of "opening and shutting," to use her own expression, behind the ears and round the back part of the head. Her breath was so offensive that it was impossible to inhale it without sickness. Her tongue was very much furred. She was sleepless. Her occupation had been that of teaching children, and working at her needle. Dr. Elliotson considered this case as one illustrating the doctrines of phrenology—namely, that it was a case where the organ of destructiveness was in an excited state, and consequently where the "instinct carnassier," as Spurzheim would term it, was strongly called forth. Here, indeed, it was not a homicidal but a suicidal propensity that existed; yet the nature of both is the same. The peculiarity in the present case, which attracted attention, was the pain and throbbing just over each ear, and extending posteriorly round the head. Every gentleman who attended to the case, was witness of this phenomenon. "This (says Dr. E.) was a very striking phrenological fact," and he goes on to state his belief in the truth of the general doctrines of phrenology. "I have examined (says he) the subject of phrenology most carefully and unremittingly, and have seldom allowed a day to pass without making some observations upon it; and, after thus examining it for ten or twelve years, I am more and more satisfied of the general truth of what Dr. Gall has announced."

"With respect, however, to the *treatment* of this woman, our patient, I considered that an inflammatory affection of that part of the head, was the cause of the pain and morbid desire which she experienced. I cupped her behind the ears to twelve ounces, and gave her calomel five grains, twice a day, and put her on low diet. Leeches were again and again applied to that part. She was admitted on the 18th of January, and 20 leeches were applied to the seat of the pain every day until the 8th of February. From that time they were applied every other day for a fortnight. Her mouth soon became tender, and as that took place, her tongue became clean, and her breath ceased to stink. At last it began to smell of mercury, but the odour was quite changed in its character, and was supportable. She twisted her head less and less, and she slept more. She was observed to sleep several hours in the night. The pain in the head left her, and she now felt relieved from the disposition to strain and injure herself. She was a deformed woman, and the lungs and heart had hardly any room to play. She was subject to more or less bronchitis, and was seized with an acute attack from being placed near a window, and it was necessary, on account of this affection of the chest, to bleed her. She was bled to six ounces, recovered from the bronchitis, was now really well, and was to be presented on the following Thursday. On the Saturday, however, being in the ward, just as usual, she was seized, I understand, (for I had left the hospital,) with pain in the abdomen, and in a few minutes died. The friends came for the body before the inspection could be completed. The head was examined, and also the chest, but nothing morbid was found in either, except the adhesion of the dura mater to the brain above the meatus auditorius externus. On account of the friends waiting for the body, the examination of the abdomen was not proceeded with, and therefore the cause of death is shut up in mystery. Whether she died from a rupture of any-thing in the abdomen, I do not know, but she was seized with pain there, and in two minutes was dead. I have no idea at all of the na-

ture of the cause of her death, although I am quite satisfied that it was in the abdomen."

Dr. Elliotson mentions some curious cases of monomania, and among others that of a lady who was constantly harassed with the dread of pollution from filth in the streets or houses. In another individual, the dread of typhous contagion was predominant, so that she would not allow her medical attendant to come in contact with her. We could add half a hundred instances of similar kinds from our own experience; but the narrative would be tiresome and useless. One of these is a lady who dreads the contagion of hydrophobia, and dare not walk the streets lest she should encounter a mad animal, or the saliva of one, which to her is as dreadful as the bite.

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## XXI.

### GLASGOW ROYAL INFIRMARY.*

#### TRAUMATIC TETANUS.

Two cases of this terrible disease are recorded, with the view of adding something to our stock of information, if such it can be called, respecting its pathology. We shall notice them very shortly.

*Case* 1. Patrick Vailly, æt. 15, was blown in the air and a good deal scorched, on the 17th April, 1830, by the explosion of a steam-engine boiler. Some collapse succeeded the injury, and after that pain in the abdomen requiring depletion. On the 27th he was convalescent, when he complained of pain in the abdomen, not increased on pressure, and on the 29th there was opisthotonos. On the 3d of May the patient died. The treatment consisted in purging with calomel and castor oil and blistering the spine. Immediately after death the body was placed with the face to the floor.

*Sectio Cadaveris*:—24 *hor. post mortem.* "The whole spinous processes and calvarium were removed, the brain and thecæ vertebrarum fully exposed. There was a little serous fluid at the base of the brain, betwixt the tunica arachnoidea and pia mater. The brain was considerably more vascular than usual, and on the posterior part of both lobes of the cerebellum there existed an ecchymosed appearance, which could easily be removed by raising the pia mater. The medulla spinalis had a perfectly healthy appearance, but a considerable quantity of partly fluid, partly coagulated blood, existed betwixt the theca and the vertebræ. The vesicated surfaces occupied the lower half of the left leg, and the outer and lower half of the right leg. Both had a green sloughy aspect, and the cellular substance was much inflamed. The veins did not appear more vascular than natural, and the arteries appeared healthy. The nerves were also carefully examined; the cutaneous of both legs, particularly the communicans tibialis and the communicating branches of the peroneal nerve with the tibialis communis, were inflamed at the seat of the injury; tracing them upwards above this point they were perfectly healthy, except that portion of the peroneal which turns over the head of the fibula, there it was again distinctly very vascular, thus leaving an intermediate portion perfectly free from the appearances of inflammation. The vascularity appeared to be confined to the sheath of each nerve; the deep-seated branches appeared to be quite natural. No other morbid appearances were detected."

*Case* 2. William Fleming, æt. 17, had the ring and middle fingers of the right hand much lacerated and injured by machinery on the 14th July, 1830; the last phalanx of the middle finger was only adherent to the second by a small slip of skin, and it was removed accordingly. On the 21st he began to experience severe pain in the fingers, and at the same time he was seized with tetanic symptoms. He was admitted on the 22d. The tetanic symptoms were somewhat aggravated, and

* Glasgow Journal, No. XIII.



the second and last phalanges of the injured fingers were completely gangrenous, and the second phalanx of both was found fractured. The fingers were removed, and calomel, with leeches to the nucha, and purgatives employed. We need not mention the subsequent symptoms or treatment, suffice it that the patient died early on the 24th, the spasms continuing both frequent and severe.

*Sectio Cadaveris*:—24 *hor. post mortem.* "The body was allowed to lie the usual way on the back till the time of inspection. The calvarium and spinous ridges were removed, fully exposing the theca vertebrarum, down to the cauda equina; there was no effusion on the brain or its membranes, and its substance was natural throughout. No effusion existed between the theca and the vertebræ; the theca was healthy, and betwixt it and the spinal cord was a preternatural quantity of serum. The cord itself was of a pale colour. The nerves on each side of the remaining phalanx of the ring finger were very vascular. On tracing upwards the ulnar nerve from this point to the elbow, it was of its natural colour, but here again it became very vascular for about the extent of two inches. In the axilla it again presented a similar appearance as at the elbow, the portion of it intervening betwixt these two points being healthy. Tracing the median nerve in the same way as the ulnar, it was found perfectly natural, from its digital branch, which supplied the radial side of the ring finger, (and which, as stated above, was much inflamed,) till about the middle of the arm, when it again presented an inflamed appearance for the extent of one and a half inch. The portion of it intervening betwixt this part and that confined to the axilla, where it again became vascular, was natural. This vascularity throughout, was not confined to the sheaths of the nerves, but occupied their substance; the radial and superficial nerves, of the arm, along with its veins and arteries, were perfectly natural; the lumbar nerves were unaffected; the œsophagus was examined, and found healthy; the trachea appeared inflamed, and contained a large quantity of greenish coloured mucus; the other thoracic viscera and digestive organs natural."

The inference which appears to be drawn from the foregoing case by Dr. Perry, is, that he would be warranted in treating any case of the kind, as a local inflammation of the nerves leading from the seat of the injury, the interruption of the suppurative process in the wound being one of the first appearances. We should be sorry to form these or any other conclusions on two such cases.

In a case of lithotomy related by Dr. Perry, nine stones were found in and removed from the bladder. The prostate was enlarged; the symptoms of stone in the bladder had existed for ten months previous to the performance of the operation. Two of the stones were situated in the inferior fundus of the bladder, and were of a flattened shape. The remaining seven were placed at the upper part of the bladder behind the pubes, each of the size and figure of chesnuts, and lying as if they had all been compressed and wedged together into the form of a ball. The stones were composed of the triple phosphate with a nucleus of lithic acid. The urine had occasionally contained "sand and slime," but never any blood.

#### SUDDEN DEATH FROM DREAD OF OPERATION.

A man aged 40, was admitted with very severe laceration of the left forearm, which had happened on the preceding day from the limb being drawn between two wheels. The integuments above the wrist-joint were emphysematous, the wounds emitted a gangrenous fetor, the pulse could not be felt at the wrist, the tongue was white, the skin warm. Amputation was proposed and rejected; a tourniquet was kept constantly round the arm, and port wine poultices applied.

The case went on well for six or seven days, when the line of separation between the sound and gangrenous parts was distinct. The injury done to the hard and soft textures of the forearm was too great notwithstanding to admit of any reasonable expectation of

being enabled to save the limb, and a communication to that effect was made in a forcible manner to the patient. His hopes had been previously excited—they were now damped—he began to shake—and earnestly declared that he could never submit to the operation. He soon afterwards sank into a comatose state—complained of nothing—the pulse was weak—the pupils were natural — a cold sweat over-spread the body — ammonia and brandy were exhibited, but he sank, and died at 1, p.m. next day. On dissection, a tea-spoonful of serum was found in both ventricles. The radial, ulnar, and anterior interosseous arteries of the injured forearm were ruptured; the bones were denuded of their periosteum and rasped.

We cannot but imagine that surgeons are often not sufficiently careful, in hospital practice, of informing patients that they must submit to operations. On one or two occasions we have seen bad effects from breaking intelligence of this kind too abruptly. We have seen a small wound in the thumb assume a sloughing character, immediately after a communication which alarmed the patient in a considerable degree.

ANEURISM BY ANASTOMOSIS.

*Case* 1. A girl, æt. mens. 18, admitted May 1st, with a large tumour, of a purple cast and doughy feel, occupying the radial half of the palm, and part of the ball of the thumb of the left hand; it frequently discharged a considerable quantity of blood through three small openings on its surface. Pressure diminished the tumour much, but its size returned on its withdrawal. Some months previously its removal by the knife had been attempted; it had been twice punctured, and some difficulty arose in arresting the bleeding. On the 4th May the tumour was removed by incision, and the actual cautery afterwards applied. On the 21st the patient was dismissed, with the wound nearly cicatrized.

*Case* 2. A child, aged seven months, admitted with a tumour an inch long and half an inch broad at the root of the nose, of purple colour, with small red vessels on its surface, reducible by pressure to a third of its dimensions. It occupied the whole space between the inner canthus of the right eye and the mesial line of the nose, and extended from the inner end of the right eyebrow to an horizontal line drawn across the face from the right ala of the nostril, covering the lachrymal duct and a third of the lower eyelid. When partially emptied, its attachment to the subjacent parts seemed firm at the inner angle of the eye only. Three months previously the child had received a blow upon the part from the edge of a hat; in a week afterwards a small purple spot was observed, which had since continued to increase.

For three weeks pressure on the tumour was made by a spring and pad, under which it ulcerated deeply, but again increased to its former size, on the withdrawal of the pad. An attempt to destroy it with the caustic potash failed next; and this was succeeded by the actual cautery, which seemed to accelerate the extension of the tumour. An incision was made at the lower portion of tumour, and carried along the side of the ala-nasi to its upper part at the end of the eyebrow; and an attempt made to extirpate it from below. The flow of blood was, however, so rapid and profuse, that to prevent fatal consequences, it was necessary to desist, and apply the actual cautery, which was in readiness. The bleeding was by this means stopped, and the wound dressed with resinous ointment. On the following day, the child was excessively weak, and refused the breast. It had been ordered a little wine after the operation, which was occasionally given for the next two days. By the 28th the tumour had greatly diminished, though still a little puffiness remained on the nasal edge of the upper eyelid, which was occasionally touched with the argent. nitrat. The mother wishing to go home, was desired to return in a fortnight, which she did. Nothing farther was done; the tumour gradually contracted; the skin is natural in colour; the eye is perfect. With the



exception of a little contraction of the internal angle of the upper eyelid; the cicatrix is scarcely perceptible.

We may here introduce a proposition of our friend Dr. Marshall Hall's, which appears in a late number of the Medical Gazette. In a case of oval nævus, rather larger than a shilling, which the Doctor attended with Mr. Heming of Kentish Town, he adopted the following plan. A couching-needle with cutting edges was introduced at one point of the circumference of the nævus, close by the adjoining healthy skin, and thence was made to pass through the tumour in eight or nine different directions, so as to produce slight incisions through its textures, parallel with the skin, but not so as to pierce the tumour in any other part. A little pressure by means of strips of adhesive plaster was applied over the tumour. For weeks no apparent effect was produced, but in half a year the tumour was found to have disappeared, and the colour of the skin to be nearly natural, without any appearance of scar. We hardly know what credit to attribute to the operation, for the cure was very tardy. The object of Dr. Hall is to prevent scar. The operation might be repeated at longer or shorter intervals, and with more or less numerous punctures, according to circumstances. But to return to Dr. Perry's report. He appears to be an advocate for the torsion of arteries now extensively practised by M. Amussat.

"I have generally applied ligatures to the large arteries, treating the smaller by torsion. In the fingers and toes torsion only was used, and in the mamma, generally torsion; in the latter cases, and tumours, it is particularly useful, as it is often necessary to dissect deeply under the skin, and the leaving of ligatures keeps up a purulent discharge; when ligatures are used in such cases, it is better to use small silk ones, and cut away both ends. The practice of suppressing hæmorrhage by torsion, or bruising of the arteries, is not altogether new; I partially practised it in 1820, along with my then colleague, the late Dr. G. C. Monteath. The circumstance which gave rise to it, was a casual conversation which occurred respecting a case of laceration of the arm by machinery, where the vessels were torn across, and no bleeding followed, a circumstance by no means unfrequent. It was a natural inference, that by bruising the arteries, destroying their vitality for a short space, they would soon cease to bleed, as a coagulum would form in their inactive extremities. From this analogy, we frequently had recourse to bruising or twisting the smaller arteries during the operation, without thinking it a matter of such importance as to call it a discovery. I do not mean by this to detract from the merit of M. Amussat, who has recommended and carried the practice farther than I have yet ventured to go. As it is often of great importance during operations to prevent as much as possible the loss of blood, whether arterial or venous, I have been in the practice of using a pair of button forceps for laying hold of the bleeding vessels, and twisting them, if arteries, or if large veins, allowing them to remain fixed till the operation is finished, and the tourniquet removed. In this way much blood may be saved, and little time lost, and in removing tumours, it prevents the operator from being embarrassed with the blood.

The button forceps may also be applied to an equally, if not more important, class of cases; I mean, for the cure of recently-punctured arteries, or in place of ligatures in cases of aneurism. If a wound is made, for instance, in the brachial artery, by bleeding, the external wound may be enlarged, and the side of the artery, where the wound is, grasped by the forceps, the button pushed down, and the forceps left for 24 hours in the wound, (the adhesion will take place in less time,) firmly fixed by means of the head of the forceps being passed through a slit in a piece of sponge, and this again fixed on the arm, to prevent motion, by strips of adhesive plaster. The forceps must be small, and rounded at the point, (perhaps those made of silver would suit best, as they do not corrode,) and the wound closed and kept together on

each side of the forceps by strips of plaster, or, if it is wished, the whole caliber of the artery may be included in the forceps, and the flow of blood completely interrupted, till the sides of the vessel adhere. I may be asked, what advantage this has over the ligature? In the first place, it is easier applied, there is less danger of including the nerves, there is no risk of insulating the artery from its connexions, and, consequently, less of secondary hæmorrhage. I shall, however, postpone any farther particulars respecting this plan of treatment until the next Number of the Journal."

We cannot say that the foregoing statements bring conviction to our minds. We have been and continue to be sceptical respecting the advantages, nay, even the safety of M. Amussat's method. We would not oppose a plan because it is new, but neither would we adopt it because it is new. It requires both caution and time to appreciate the merits or the mischiefs of all new modes of practice. The advocates for torsion ground their arguments on the fact that lacerated arteries frequently do not bleed. Very true; but occasionally they do so, and not very unfrequently secondary hæmorrhage occurs from them. However, as we have already hinted, we yet want many facts to justify a sound and practical man in assenting to M. Amussat's opinions. The statements of M. Amussat himself are certainly strong, but what new medicine or what new operation ever wanted powerful *facts* to support it? On the 31st January M. Amussat introduced to the Academy of France four patients on whom he had operated. Three were children of seven, nine, and twelve years of age, who had had their right thighs amputated about the same time, for white-swelling of the knee-joint. The next was a man fifty years of age, the end of whose humerus was shattered by a ball; in him the amputation was not performed till the 26th day. The arteries were twisted in all, and secondary hæmorrhage occurred in none. In the youngest patient the wound was perfectly healed by the first intention in seven days. We repeat that evidence enough has been brought forward by M. Amussat to prove that his proposal is not to be scouted; but not enough to induce good surgeons to yield blind acquiescence and assent to all the advantages claimed for it by its author. Time, and time only, will determine the merits of the case.

## XXII.

### DR. RAMADGE AND ST. JOHN LONG.

THE letter which has been published with the signature F. H. RAMADGE—FELLOW of the ROYAL COLLEGE of PHYSICIANS, and addressed to St. John Long, is calculated to call forth the most painful reflections in the mind of every man who has the honour of the medical profession at heart. Of the author we know little—and never wish to know more. It is with the LETTER—the *litera scripta* that we have to do, as the legitimate object of criticism. A more disingenuous and sickening epistle never emanated from the press of this or of any other enlightened country. If the LETTER of an individual were capable of disgracing a whole profession, the letter in question is calculated most effectually to do so! While it labours, by every art, and by every species of misrepresentation, to support an ignorant quack, it endeavours, by the same means, to traduce a liberal profession! The wealth of Golconda's mines and the proffer of universal dominion would not induce us to be the author of such a production. Of the objects or intentions of the writer we profess not to judge. They are only known to himself and to his God. But we conceive that the inevitable effect of that letter will be a reprobation of the writer by the whole body of his brethren. It is impossible it can be otherwise. The man who justifies and even extols an ignorant Charlatan, reviling and defaming the regular members of the Faculty at the same moment, cannot expect any thing but indignant contempt from those whom he labours to injure and degrade.*

* Since writing the above, Dr. R. has been expelled the London Medical Society.



This long epistle is thrown into numerical sections, like the counts of an indictment—and no doubt they have *counted* well, both for the inditer and *indicted*. In the *first* count, the writer, of course, professes rigid *impartiality* between the quack and the faculty! He has taken a strange method of shewing his neutrality! In the *second* count there is abundance of hypocrisy, but a lamentable lack of candour. The writer was at first strongly persuaded that Long's treatment of Miss Cashin and Mrs. Lloyd had led to their untimely death. This persuasion was, of course, founded on the evidence of facts. But after a long time—"after deep reflection"—(nothing else?) says the impartial letter-writer, "my opinion is *now* entirely changed." The *third* count tells the quack what the quack would fain forget, namely, that Miss Catherine Cashin was his patient, and that, "apprehending her *disorder* (what disorder?) might become as *precarious* as that which *promised* speedily to terminate in the demise of her sister," he employed precautionary measures, &c. The writer then justifies Long's employment of one or two remedies for all diseases, on the plea that "many eminent practitioners of the present day, are in the habit of employing only one or two remedies in the cure of almost every disease." The tendency of this last assertion, published by a Fellow of the College of Physicians, in a common newspaper, is obvious enough. The assertion itself is as mischievous as it is void of foundation. The writer appears to assume it as a fact, that Miss C. Cashin *did* labour under *disorder* at the time when the quack began his operations—if he had weighed the authentic evidence on this occasion—if he had trusted to facts, and not to fictions, he would have been perfectly satisfied that the lady was in fair and good health.

The *fourth* count is as neat a piece of puffery for Long, as ever emanated from DAY and MARTIN'S factory in Holborn. The writer, it seems, has been at immense pains to ascertain, by "a multitude of inquiries," the innocuous qualities of Long's liniment—and in no case—(not even excepting those of Miss Cashin and Mrs. Lloyd?) did the liniment or the inhalation produce the least "noxious or unpleasant effect."

But the *fifth* count is the most uncandid and unprofessional representation that we have ever read.

"The *post-mortem* examination of Miss Cashin satisfactorily proves to me the correctness of your judgment as to the existence of *pulmonary disease*, and which, in my opinion, fully justified you in the steps you took, in the hope of suspending or removing an affection of such fatal tendency."

Will it be believed, that in our own day, a FELLOW of the ROYAL COLLEGE of PHYSICIANS would, in the face of facts recorded on oath by several medical men, come forward and tell the public that the examination of Miss Cashin's body exhibited *pulmonary disease*, to the amount, or to any thing like the amount, which is stated above? This monstrous assertion, too, is made by a man who did not see the body examined, but who coolly avers that the examinators saw what all declare upon oath that they did *not* see, viz. disease of dangerous tendency! This, in fact, is giving the *lie direct* to all the medical witnesses. The writer of the letter, therefore, cannot expect that men, whose veracity is thus unceremoniously impugned, or their evidence distorted, can shew much delicacy, *in manner*, to him who thus insults them.

After the foregoing specimen of veracity and impartiality in the LETTER, it is almost an insult to our readers to take further notice of it. The whole is a tissue of presumption, illiberality and special pleading. The following reflection on his brethren is deserving of notice, because we happen to be able to illustrate it.

"As ten days elapsed before Mr. Vance was called in, after Mrs. Lloyd had been under the care of another practitioner, I consider it needless to make any further comment upon his evidence, with this exception, that '*if* you stated Mrs. Lloyd had suffered disease of the chest, which dissection is

said not to have proved to be the case,' your mistake is not solitary, for I hardly know *of one* of the profession, of whom I have not heard, and of many of whom I have not *been a personal witness of their erroneous judgments.*"

Now for a comment on the above. It is not many months since the writer of this article was requested to visit a young surgeon, lately returned from India, (Mr. Wittle) and then lodging in Tottenham Court-road, in consequence of Dr. Ramadge's decision that there was empyema of the left side of the chest, requiring *paracentis thoracis*. The brother of the patient insisted on Dr. —— seeing him before the operation should be performed. Dr. —— examined the chest, and could discover no sign whatever of empyema. Dr. Barry then visited the patient, and, after careful auscultation and percussion, declared there was not a drop of fluid in the cavity of the pleura! It is hardly necessary to add that the gentleman soon got well without any operation—is now married, and gone to India! So much for Dr. Ramadge's skill in auscultation, and for the numerous errors of judgment which he has witnessed among his brethren. This anecdote, which Dr. —— never before mentioned, either publicly or privately, but which is now called for, on account of the illiberal attack on his brethren, may teach Dr. Ramadge, that he who lives in a house of glass should not be too anxious to get into the habit of throwing stones, lest some panes in his own sky-light be broken in the diversion.

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## XXIII.

### LIGATURE OF THE CAROTID ARTERY FOR HEMIPLEGIA, WITH A CASE IN ILLUSTRATION. By Mr. PRESTON, Assistant-Surgeon, General Depôt of European Pensioners, Cuddalore.

THE paper which has been transmitted to us under the above title, was too detailed and voluminous for insertion in this journal, and therefore we have given an abridgment of it, reserving the original document for the author, if he claims it.

*Case.* Peter Rachford, ætat. 50, was admitted into the Depôt Hospital, on the 25th October, 1830, with the following symptoms:—loss of power and sensation in the left side of the body—left cheek droops, and is drawn towards the opposite, when he attempts to speak, which is now almost impracticable—pain in the paralytic leg—head free—circulation natural—skin cold—tongue clean—bowels open. The foregoing symptoms came on suddenly the preceding night. The man has always been a hard liver, and had been much intoxicated about a week before the seizure. A blister was applied to the head and ten grains of calomel were exhibited twice a day. On the 28th the mouth was slightly affected; and the calomel being continued, salivation ensued. About this time iodine was also given, and a seton was inserted in the nape of the neck. On the 13th November, there being no mitigation of the paralytic symptoms, we find the nux vomica was exhibited. On the 17th he evinced pain and tenderness in the region of the liver, for which he was leeched and blistered. The pain was removed, but the other symptoms remained nearly the same.

On the 22d November, the paralytic complaint being in statu quo, Mr. Preston determined on tying the carotid artery of the right side, in conformity with the general fact, that the cause of the paralysis is in the opposite side of the head. The steps of the operation need not be detailed. In the evening of the same day, there was no perceptible inconvenience from the operation.

23d. Slept pretty well last night—skin warm—pulse 100, and not intermitting, as it had generally done before—tongue thickly furred, but moist—slight cough, and uneasiness in the chest. There was also some difficulty of deglutition. In the evening, the pulse was down to 80, and soft—skin warm and moist—bowels confined. Ol. ricini statim.



24th. Pulse 60, irregular, and intermitting. Complains of more pain in the paralytic arm.

26th. He appeared to speak more distinctly, and in two days more spoke as distinctly as at any period of his life. On the first of December he was put upon half-diet. 4th Dec. Has considerably recovered the power of the left leg, which he is able to draw up and down. He this day attempted to walk, but did not succeed. The arm is still completely powerless. The appetite is good, and he sleeps well. 12th. December, we find the patient able to walk alone, with the aid of a stick. The arm is still paralytic. 15th. The wound is quite healed, except at the spot where the ligature protrudes. He was discharged the hospital on the 30th of December, at his own request, being able to walk about very comfortably with the assistance of a stick, but the paralyzed arm still without any muscular power.

The following are Mr. Preston's reasons for the operation.

"In tying the carotid artery for palsy, I have deviated entirely from the treatment pursued in that disease, and was led to undertake the operation from the consideration which I subjoin.

I conceived generally that it might be had recourse to, with great advantage, in diseases of the brain, especially such as we had reason to believe, depended upon congestion, inflammation or irritation of that organ; as its principal effect would be, to diminish its supply of blood—an object we have more or less in view in the treatment of cerebral affections; although it cannot always be accomplished by depletory measures.

Venesection and the application of leeches often increase the determination to the head; partly by the disturbance they excite generally in the system; and partly by the reaction which frequently follows their employment.

It appeared to me also that a more durable, and more decided effect would be induced by this operation than by any mode of depletion; and that it might entirely remove, or greatly diminish congestion and chronic inflammation of the brain and its membranes; the causes, I believe of many diseases, which the common modes of treatment too frequently fail of relieving.

As palsy may be induced by some change in the brain itself, either functional or organic, without any complication of the spinal marrow, it appeared to me a disease likely to be affected by this operation; and as, from the suddenness of the attack in the present case, I was inclined to attribute it to some such change,—(I conceived extravasation within the cranium)—it seemed a favourable opportunity for trying its effects. I believed that the pressure caused by the extravasated fluid, might be removed by the diminution in the volume of blood sent to the head; which would be affected by tying one of the carotid arteries. The paralysis too, I was aware might depend upon a very different cause from that conjectured, and yet be removed by this operation: for we know too little of the diseases of the brain and its different affections, to be certain in every case of their precise nature, and to predict always with accuracy the result of the measures we employ with a view of removing them. If the palsy arose from congestion, inflammation or irritation, it appeared equally eligible as in the case supposed by me; but my principal reason for undertaking it in the present instance, supported by the arguments I have already adduced, was, that the case appeared otherwise hopeless; the disease being altogether unaffected by the remedies I had employed and the patient's strength beginning to sink.

Obliteration of the common carotid artery on one side has been frequently effected, without any ill consequences attributable solely to it, and without any disturbance of the brain, heart or lungs. How far it would be safe to tie this artery on both sides, is a question of very serious consideration. It has been done repeatedly on the dog by Bichat, and death occurred in only two instances. I have myself tied both these arteries twice in the same animal but without producing any effect.

Under desperate circumstances, and at an interval of some time after tying

the first; we would, provided no relief followed, and the case otherwise hopeless, I conceive, be justified in tying the second. It might, however, be done with a slip knot, or in such a manner as to admit of the ligature being loosened, should any alarming symptoms follow, or the ligature might be applied so as to intercept only a portion of the blood, sent to the head by narrowing, at the part, the calibre of the artery—we might thus easily increase or diminish according to circumstances the column of blood which it transmits.

The operation itself excites no constitutional disturbance, or but very little.

I quote the passage from Bichat—in which however there is some obscurity, probably from some error of the translator—as also the same, worded somewhat differently, and found in Rees's Encyclopædia, article—heart.

From Bichat.—

'It is easy to prove that the movement of the blood is necessary to that of the brain, expose the brain of an animal in part and tie the carotids.

In such case, the cerebral movement will be sometimes weakened, and then the animal will be stupified, at other times the vertebral arteries will exactly supply the place of the carotids, and then there will be nothing deranged in the principal functions of the brain: for there is always a relation existing between the alternate rise and fall of the cerebral mass and the energy of life which it displays.

*In general, the obliteration of the carotids is never suddenly mortal. Animals will live without them, for at least a considerable time. I have kept dogs in this state for several days*, and have afterwards made use of them for other experiments; two however died in the course of six hours after the application of the ligatures.'—*Gould's Translation*, page 157.

The part that seems obscure in the foregoing paragraph I have underlined. The number of dogs that died after this operation is not specified, nor at what interval of time.

The same passage is thus worded in Rees's Encyclopædia.

'The heart, which propels the red blood, affects the brain by the motion which it communicates to that organ. If the arrival of this fluid be completely intercepted the motion of the brain ceases, and life is extinguished; where the carotids alone are tied, the vertebral arteries still keep up the movement and no ill effect is produced.'

The diseases in which I conceive this operation most likely to prove serviceable, are, such as depend upon determination of blood to the brain, congestion, inflammation, or irritation of that organ; but it must be understood, that I propose it as a remedy only after other means have failed. I may here specify apoplexy, phrenitis, hydrocephalus, many cases of injuries of the head, palsy, epilepsy, and insanity; which latter disease is now generally admitted — indeed known to depend upon a change of some kind in the brain or its membranes; most commonly some modification of inflammation or its products. Where this organ in insanity is affected only from sympathy with some other; how far tying one of the carotid arteries would be serviceable must, I fancy, depend upon considerations connected with each particular case. Here, as in more dangerous diseases, both these vessels might be tied with the precautions already stated; allowing a longer interval of time to elapse between the operations. There are some other points connected with this subject upon which I am at present unable to enter, but which upon a future occasion I hope to lay before the Board."

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## XXIV.

### CHARITABLE INFIRMARY.

### On Spinal Irritation. By Dr. Corrigan.

We are not sorry to find Dr. Corrigan in the field of practical medicine, instead of the labyrinth of the theory, or the deceptive quagmires of experiment. Although we have taken the liberty to



differ from Dr. C. respecting the action and sounds of the heart, we shall be happy to meet him on less debateable ground—where cultivation will be sure to produce a good harvest.

In a clinical lecture delivered at the Charitable Infirmary, in Dublin, and published in our weekly contemporary, the LANCET, we find some interesting cases, with observations, of SPINAL IRRITATION, which we here propose to notice.

Dr. C. prefaces his observations on spinal irritation by remarking that morbid anatomy cannot be expected to throw much light on our investigations here, since the disease, though distressing, is seldom fatal—and since diseases of the nervous system do not always leave any visible trace of their existence, when death ensues.

"It fortunately, however, happens, that we have other means than those afforded by morbid anatomy, for ascertaining the seat of the disease, and by which we can, even during life, trace most distinctly the connecting link between cause and effect, or, in other words, between the diseased action and its symptoms. If we meet a patient complaining of hemicrania, or of pains in the neck and face resembling tic douloureux, and that we can produce or aggravate these distressing symptoms by pressure on the cervical vertebræ;—if we find another complaining of fits, of suffocative breathing, palpitation of the heart, and distressing sense of weight behind the sternum, and that we bring on, or aggravate, these symptoms by pressing on the dorsal vertebræ:—if we find another complaining of pains in the epigastrium and both hypochondria and globus hystericus, and of flatulent distention of the stomach, and that we can at any time bring on or aggravate all these by pressure on the lowest dorsal vertebræ;—if we find pains complained of in different parts of the body, in the right or left mamma, right or left hypochondrium, or in varied parts of the abdomen, and that pressure on the part of the spine generally corresponding in situation to the seat of the pain, aggravates the pain, or produces it if previously absent;—if we find, moreover, that local applications over the spine remove the distant symptoms or pains, not relieved by any other mode of treatment;—the fair inference from all this surely is, that the seat of disease is within the spine, and the connexion between the symptoms and the disease, between cause and effect, is, in such cases, more clearly exposed before us, than when even after death from acute disease, the knife of the pathologist exhibits to us some important lesion of structure, of which, rigidly speaking, the most we could say is, that it was probably the cause of the symptoms during life."

*Case* 1. This was a man, aged 27 years, a coach-painter, who was admitted on the 27th February into the Charitable Infirmary, complaining of flatulence, pain and tightness in the head and at the scrobiculus cordis, pallor and anxiety of countenance. The tongue was clean, pulse 90, respiration a little increased.

"There is pain along the course of the supra-orbital nerve of the left side. His sight is weak, and he cannot raise his eyes to any object above him, without experiencing pain and giddiness of the head. He is frequently attacked by 'globus hystericus.' He describes it as 'a ball of some kind' arising in his stomach, and ascending to his throat, where he feels it choking him; he also frequently experiences a sensation of tightness across his chest, which often prevents him from speaking when he wishes to do so. For the last two days he has had pain along the calf of the left leg, and weakness across his loins. His appetite is not impaired, but strength is much diminished. He has frequent pains across the epigastrium and both hypochondria, his nights are restless, and he starts often from his sleep, aroused by terrifying dreams; there is slight cough; epigastrium and both hypochondria are very tender under pressure, and pressure on the epigastrium produces instant cough and difficulty of respiration. The result of pressure along the spinal column is as follows:—pressure on any of the cervical ver-

tebræ produces pain and lightness of the head; on the superior dorsal, produces tightness in the chest; on the inferior dorsal and first lumbar, produces pain at the scrobiculus cordis, flushing of the face, perspiration, and violent eructation of wind from the stomach; lower down produces no effect."

The patient was treated in a very simple manner. Rest, aloetic or oily purgatives; cupping, leeching, and blistering the spine, with the application of antimonial ointment, constituted the whole of the treatment, and the man was discharged cured on the 4th of April, or about 50 days from the time of his reception.

Without casting the shadow of a doubt on the facts of the above case, we cannot help expressing a little scepticism as to the inferred pathology of the disease. We have seen so many cases, especially in the female sex, where the above anomalous phenomena have presented themselves, but where the result disproved the cause to be spinal irritation, that we look on Dr. C.'s case with some distrust. The fact, however, is indisputable, that, in these cases, pressure on the spine often causes effects which are almost inconceivable. In the case of a young lady whom we have attended for some years, we were surprised to find that pressure on the two or three superior dorsal vertebræ produced convulsive motions of the lower extremities, and even of the abdominal muscles. We thought we had discovered a key to the host of nervous and hysterical symptoms with which this lady was harassed; but we were deceived. Horizontal posture, leeches, blisters, antimonial plasters, produced not the slightest relief, but rather aggravated the complaint. We afterwards found that a far less degree of pressure a little to the left of the epigastrium induced the same convulsive action of the muscles, as pressure on the spine—and even in a much higher degree. These phenomena are almost inscrutable. That they are referrible to the nervous system, we have no doubt; but that "SPINAL IRRITATION" conveys a true idea of their nature or seat, we are disposed to deny. And as to the *cause*, it will probably lead us astray. In the case to which we have just alluded, the presence of food, more especially any food of difficult digestion, in the stomach, produced not only twitchings of various muscles, but a strong disposition to *suicide*. So dreadful were the "MENTAL IMPRESSIONS," (the term applied by the patient,) that she nearly put an end to her own existence by starvation, to avoid the horrible feelings produced by food in the stomach! It is a curious fact, but one worth recording, that the medicine which was most operative in preventing these mental impressions, was five grains of the hydrargyrum cum creta taken an hour before dinner. The unhappy patient has often declared that, without the "grey powder," she had rather die than take food at dinner! We shall here introduce two or three other cases detailed by Dr. Corrigan.

*Case* 2. "The patient was a lady who, after her first confinement, suffered for several months from great weakness. When I saw her, about five months after her confinement, she complained of severe cough, difficult expectoration, and distressing sense of suffocation; these symptoms, particularly the last, much increased in the evening. There were constant pains in both hypochondria, in the epigastrium, and behind the lower third of the sternum. These pains were not increased by full inspiration, and only in scattered points of the right hypochondrium by pressure. Pressure on the last dorsal vertebræ aggravated them. Leeches were applied to the spine, and a recumbent posture was enjoined. On the next day she was much relieved of all her symptoms, and on the day following felt so very well, that she left the bed; and now the disease showed one of its most striking characters, viz. its connexion with change of posture. The exertion of dressing brought back all the symptoms in minor degree, although previous to rising from bed, no trace of the disease was observable. They again disappeared after short rest in a recumbent posture on a sofa. Rest was again enjoined, and the improvement again proceeded rapidly, convalescence being only interrupted by a walk a little too long, which, like the exertion of dressing already alluded to, produced a temporary aggravation of the symptoms."



*Case* 3. "The patient, a gentleman of about thirty-five years of age, complained of distressing paroxysms, which came on frequently in the course of each day, and often without any apparent immediate cause. The paroxysms commenced with a sensation of great distress, referred to some internal part behind the inferior third of the sternum, and rising from it upwards to the head; his eyes filled with tears, he became incapable of speaking, and his mental agony during the continuance of the fit was extreme. The paroxysm did not last more than a few minutes, and was then terminated by one or two heavy long-drawn sighs. The clapping of a door, an unexpected meeting with an acquaintance, or any similar trivial cause, was sufficient to bring it on. It seemed as if, in this case, the sympathetic ganglion, to which some refer the seat of the passions, was engaged, for pressure on the epigastrium was immediately followed by all the distressing symptoms already described. The third, fourth, and fifth dorsal vertebræ were tender, and pressure on them was attended by the same effects. A towel was dipped in warm water and passed slowly down the spine. The moment it came over the tender vertebræ, the same results followed as from pressure. The history of the case was this: About twelve months before, this gentleman suffered under much anxiety of mind from a weight of business; then, for the first time, he felt the sensations described, which never up to the time of my visit quitted him. The same treatment was prescribed as for the other cases."

*Case* 4. "A lady, æt. 50, came to town for advice with the following symptoms:—She felt severe pain about the umbilicus, and in the left lumbar region; this pain was always brought on, or greatly aggravated, by taking food; relief was obtained after a meal by lying down, and the pain which remained present during the day always ceased soon after retiring to bed at night; the abdomen was soft, and the digestive functions well performed; the spine had two lateral curvatures; there was a little tenderness, under pressure, of the two last lumbar vertebræ, but pressure on them did not bring on the pain of side. The history of the case was this: having previously suffered under great depression of spirits, consequent on the death of several of her children, this lady first felt, about three months before, some uneasy sensations about her shoulders, which obliged her to rest her back when knitting or sewing. These were followed by pain in the region of the liver, extending into the right hip, and, finally, all seemed to concentrate themselves in the intense pain of the left side already described. For the pain in the region of the liver she had been put under a course of mercury, and finally, from a fear that malignant disease of the stomach, or some of the organs in its immediate vicinity, was setting in, she was put on hemlock, and repeated blistering was ordered over the seat of the pain. All these measures failed to give relief. The first circumstance that made me look upon this case as one of spinal irritation, was the remarkable effect of posture. Moreover, there was not fever, nor wasting, in proportion to the intensity or the duration of the pain. Leeches were applied to the spine, and afterwards counter-irritation was kept up by tartar-emetic ointment. Two grains of sulphate of iron were at the same time ordered as a tonic, three times a day, and her bowels were kept open by Rufus's pill. Rest was of course enjoined for a few days. From that time up to the present, and several months have elapsed, there has not been a return of the pain in the slightest degree."

Our readers will form their own conclusions, as to the above cases, which are, however, very interesting, whatever theory may be employed for their explanation. For our own parts, we are much more disposed to attribute

the phenomena to irritation of the ganglionic nerves, as distributed on the different viscera, than to spinal irritation. We advise Dr. Corrigan to prosecute the inquiry, and to attend to the state of the digestive organs, and of the uterine system, in females, when he will probably find cause to suspect the cause, if not the seat of the disease, in other parts besides the spine.

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## XXV.

### ABERDEEN LUNATIC HOSPITAL.

CASE OF INSANITY AND PARALYSIS, WITH DISSECTION.

PETER KEITH, ætatis 66, a carter, formerly in the navy, admitted 2d Sept. 1829.

About eighteen months ago he became gradually affected with insanity. Imagines himself to be Admiral Keith, and related to the Royal family and indulges in other delusions of a similar description. He has been occasionally violent, requiring restraint—was much addicted to the use of spirits and frequently drank to intoxication.

19th July, 1830. His delusions still exist, but without the least excitement. Can answer questions at times coherently, but seems stupid and greatly enfeebled in his intellect; and has a good deal of stammering and difficulty in articulating. For the last two months he has laboured under a partial loss of power of both lower extremities, which is reported to have come on gradually. Pulse very feeble. He cannot rise from bed, nor move the limbs, further than drawing them a little upwards with much exertion. No complaint of pain or uneasiness in any region of the body.

27th Jan. 1831. During his confinement to bed he retained his appetite to within a day or two of his decease, and suffered no pain, unless from occasional tympanitic distention of the abdomen, relieved by laxatives and aromatic tincture. His feet and legs became extensively œdematous at one time, but this also disappeared and did not recur. About a month or two before his death he experienced the same partial loss of muscular power of the superior extremities. His pulse was generally feeble and bowels torpid. He was allowed a nourishing diet and tumbler of porter daily.

The symptoms having varied little from the date of the above report, he died this day.

*Dissection 36 hours after death.* The body was full and muscular and well covered with fat; his appetite having continued good to the last.

The calvarium being firmly adherent to the dura mater produced in its removal a laceration of the latter and allowed a considerable quantity of serous fluid to escape. There was a copious gelatinous deposit over the entire surface of the hemispheres between the pia mater and arachnoid, and forming a layer of considerable thickness more especially over the anterior lobes intermixed with some serous fluid.

The latter membrane was quite opaque and probably thickened. The substance of the brain as well as the membranes were by no means vascular.

There was situated between the middle and posterior lobes and immediately under the tunics a small irregular-shaped cavity with vascular parietes, without distinct boundaries, containing the debris of softened and broken down cortical substance. The ramollissement extended into the medullary substance where it gradually disappeared in the surrounding healthy structure.

There was a most decided tendency to a general ramollissement of the cineritious matter generally, and of the central parts of the organ more especially.

The medullary substance, was comparatively free from this disorganising process.

The ventricles were greatly distended with fluid. The lungs were quite sound, with the exception of a small mass of crude tubercles situated in the apex of the right superior lobe.

The parietes of the left ventricle of the heart were considerably hypertrophied, and those of the right were, on the other hand, much attenuated; in some parts entirely deprived of muscular fibre, and reduced to a thin layer of adipose tissue. The liver was rather friable. Other viscera healthy.

The foregoing appears to be a pretty well marked case of what Georget terms "chronic muscular paralysis," and corresponding in its pathology (as proved by dissection) with the general description of this class of cases as given by the above author and noticed by Dr. Burrows in his ninth Commentary on Insanity.

The exciting causes were such as tended to induce repeated vascular excitement and such as would ultimately tend no doubt to terminate in a permanent chronic inflammatory action in some region or organ of the body.

The ramollissement may therefore, in this case at least, be fairly considered as the effects of vascular action.—J. M.
*Lunatic Asylum, Aberdeen,*
31st Jan. 1831.

N.B. It is to be hoped that the medical officers of lunatic hospitals will take advantage of their situations and furnish their professional brethren with records of the phenomena and pathology of insanity — records which are much wanted in this country.—ED.

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## XXVI.

CASE OF EXTRA-UTERINE FŒTATION. By *M. F. Wagsteff*, Esq.; with a Plate.

"ON the 28th of April, 1829, I was desired to visit MRS. RONDEAU, a married lady, about twenty-five years of age. I had delivered her of twins in her first accouchement, and of a single child in her second, which child, at this period, had not been weaned. No irregular circumstances occurred in either of those labours.

I found her reclined on a sofa, on the right side, her countenance very pallid, pulse greatly accelerated and small, much anxiety about the præcordia, lancinating pains in the abdomen, constant tenesmus both of rectum and bladder, with frequent vomiting.



Her mother gave the following statement of the previous occurrences:—

'After having eat some cold lamb and potatoes, and drank a glass of porter, we walked together into Blackfriars' road, (about half a mile), when MRS. RONDEAU *suddenly* complained of *acute* pain in the body, and requested a coach to be procured, in which she was conveyed home, where I gave my daughter some warm brandy and water immediately, supposing the pain to have arisen from indigestion, especially as it was attended with vomiting and relaxation of the bowels, and applied warm fomentation: this took place at two o'clock; at four, (as I found the pain increase,) I sent for you.'

The symptoms, as they appeared on my arrival, I have just described: they were very analogous to those of Cholera Morbus, but, as no inflammatory symptoms supervened, I prescribed anodyne and carminative medicines.

The pain continued during the whole evening; the abdomen enlarged, the pulse diminished, and, a little before twelve the same night, she expired.

The rapid progress and fatal termination of this case naturally excited a desire to be better acquainted with the *cause* of dissolution, which was not clearly shown by the SYMPTOMS; I, therefore, requested permission to inspect the body, which was readily granted by the relatives.

On the subsequent afternoon I went, accompanied by Mr. NORDBLAD, Curator of St. Thomas's Museum, and my Son, to make an examination, of which the following is the statement:—

### SECTIO CADAVERIS.

On the appearance of the body, fourteen hours after death, the surface exhibited a completely blanched state, with fulness and tension of the abdomen.

On cutting through the abdominal muscles, the peritoneal sack was found to be distended with *blood*, (amounting, by weight, to four pounds fourteen ounces,) partially coagulated.

While this was being removed, cautiously, a fœtus was discovered in it of about seven or eight weeks' growth.

No laceration appearing in the uterus, attention was naturally directed to the appendages of that viscus, when the part where the fœtus had escaped was manifested by the ragged placenta, which hung from its situation in the left fallopian tube.

This left no doubt as to the nature of the case. The parts were then removed, and on a careful examination, it was ascertained that the fœtus had been contained in a sac formed by the left fallopian tube.

This sack was equal in size to a pigeon's egg, and occupied two-thirds of the length of the tube, nearest to the uterus.

The remaining portion of the tube was of its natural size, and its fimbriated margin free from obstruction.

A probe passed along its canal, stopped abruptly at the commencement of the dilatation, where the placenta protrudes; the distention of its sac increased to its centre, at which part it had given way, allowing the exit of the fœtus.

The rupture is as large as the point of a finger, and through it a detached portion of the placenta hung into the abdominal cavity.

The body of the uterus had enlarged to a size equal to that of the same viscus at a similar period of gestation; its walls were thickened and its cavity lined by recent deposit, evidently forming the decidua.*

A careful examination could not detect any rent in the peritoneal surface, nor was there the slightest mark of visceral disease.

REMARKS.

Extra-Uterine Fœtations are probably more frequent than we have been accustomed to imagine: little was known about them previous to the last century.

Mr. Turnbull, a surgeon of eminence, published a case of Extra-Uterine Fœtation, of the ventral kind, where pregnancy had existed fifteen months, and the child was *(post mortem)* removed by him from the abdomen. In this publication he refers as far back as 1683, to a case published in the Philosophical Transactions of that date, and gives a list of references to various authors, down to the days of Drs. Smellie, Lowther, and Garthshore, and so on to his own case, published in 1791.

He remarks, 'that, although it is generally understood that the uterus is essentially necessary for the purposes of conception, yet these different fœtations incline us to believe that it is not *absolutely so*, and that the principal advantages which that organ possesses over other living parts are derived from its situation and dilatable powers, and from its being possessed of *muscular* structure with an *external opening*. The former being admirably calculated for the purposes of growth and evolution, without any interference with the vital parts; and the latter for the prevention of hemorrhages and the expulsion of the fœtus.'

The case I have just related seems calculated to corroborate this hypothesis. Does it not prove that the uterus is only a receptacle? though evidently the best suited for the purpose (being the natural one); yet, in this particular instance, the fœtus was nourished seven or eight weeks in its unnatural habitation—the fallopian tube, which, being impervious at the uterine extremity, could not permit the passage of the fœtus into the uterus.

A question here naturally arises, How was the fœtus nourished? It continued to enlarge until the texture of the fallopian tube gave way to over-distention.

It is evident that its nourishment was obtained from the vessels of the placenta, which received it from their numerous ramifications on the internal surface of the fallopian tube. Suppose, in the expulsion of the fœtus through the rupture in the fallopian tube, the funis umbilicalis had not been separated, but remained perfect, would it not have continued to supply the fœtus from the same source it had done before, namely, the internal surface of the fallopian tube; and might not its ramifications have been extended over neighbouring parts, and thereby produced a supply, augmenting with the enlargement and demand of the fœtus?

The generally-received theory is, that the ovum is impregnated in the ovarium and becomes detached in consequence; the fimbriæ of the fallopian tube, having seized the ovarium, conveys the ovum, at the moment of its detachment, into the uterus, for nourishment; but, if they should miss their grasp,—or, having obtained it, should loose their hold, it must fall into the abdominal cavity, and thereby constitute a ventral case.

Adhesion readily takes place, from which ramifications are soon found to extend, and obtain a supply for the nourishment and growth of the fœtus.

In *this case*, however, it would appear that the impregnated ovum had been conveyed *(by the fimbrial grasp)* into the fallopian tube, but, meeting with obstruction there, it remained until its enlargement caused the tube to be ruptured: yet it had formed ramifications *within* the tube, from which it received its nourishment.

To the rupture of the funis, &c.—partial separation of the maternal portion of the placenta—are to be attributed the death of the patient, for nearly five pounds of blood were found loose in the cavity of the abdomen.

When we consider the smallness of the funis at that early period of pregnancy, we cannot reconcile that a sufficient quantity should have been so rapidly extravasated from the funis alone as to terminate fatally.

We have to regret that, had we even been acquainted with the symptoms, we were not likely to remedy the evil. Speculative theory might induce a bold surgeon to divide or tie the fallopian tube, but with what result is perfectly conjectural.

The case I have just described must for ever have remained in obscurity, except for a *post mortem* examination. I, therefore, congratulate the Profession on the advantages which the present age affords over former times to the pursuit of pathological inquiries.

The occurrences of peculiar phenomena,—deviations from the laws of the animal economy,—alteration in the structure and functions of any of the organs of the human body by disease,—are at all times peculiarly interesting to the contemplative Physiologist and Pathologist."

* "This is a peculiar circumstance, worthy of investigation. How does it happen that the decidua should be *forming in* the uterus when the fallopian tube was imperforate *beyond* the fœtus. No communication whatever between it and the uterus. The uterus had taken on its action of pregnancy although empty, and a deposit to form, or forming a membrane.

Is this by the excitement of aura or by sympathy and consent of parts?"



## XXVII.

### CHANGE OF AIR. PULO PINANG.

THE following remarkable instance of the salutary effects of CHANGE OF AIR, more especially of a change from the plain to the mountain, is taken from a work published in India by Dr. Ward, but not circulated or known in this country. The work will be noticed more at large in other parts of this Journal.

"An officer of rank, 32 years in India, had been for the last 14 years of his life, subject to repeated attacks of disease, originating in a morbid affection of the colon, a little above the caput cœcum, at one time producing distressing dysenteric symptoms, at another obstinate alvine obstruction. He had been subjected to various courses of medicine, and various methods of treatment, each only with temporary benefit. Five months after his arrival on this Island, he had a recurrence of the dysentery, which was relieved by a course of blue pill, Ipecacuan and Opium, with occasional doses of oil. He afterwards ascended the Great Hill, remained there two months, and returned comparatively well. Six months after, the disease again recurred, and then was evidently accompanied with deranged liver. These were palliated by a course of mercurials, castor oil and emollient

enemata, with occasional doses of hyosciamus.—On the evening of the 31st of January, 1830, he had a recurrence of the violent spasmodic pain in the region of the colon, he passed a wretched night, had repeated chills and flushes; felt great depression of spirits and total failure of strength. He had recourse to the measures above stated, with only slight benefit. On the 7th February, the following symptoms were noted. He was much emaciated; his cheeks sunk; his face and eyes sallow, and patches of yellow appeared about the lips and here and there upon the face. His eyes were dull; his forehead was warm, and the skin generally warmer than natural; his voice was faint and low, and conversation was difficult; pulse 120, irritable, compressible; tongue coated with an orange fur. His dejections were bilious, copious, offensive and mucous. Pain in the region of the colon, relieved by rubbing and hot bottles. A distressing dry cough came on four days ago; fulness and pain were present in the right hypochondriac region, and during the cough, he felt as if something was tearing the epigastrium. He had repeated flushings of the face, and occasional chills; a sense also of fluctuation as if water trickled down his back, and a cold clammy perspiration about the loins. His strength was exhausted; appetite gone, and there was increased thirst.—In consultation it was determined that the case was one of great emergency, that the symptoms threatened the occurrence of abscess of the liver superadded to the disease of the colon; and that the object of remedial measures was to support the system, until it could be acted upon by mercurials. Change of air, and that immediately, suggested itself, as the most likely means of effecting this; and as there was a difference at that time of 14° between the valley where he was living and the Great Hill, he was recommended to remove to the latter without the least delay. He accordingly ascended the mountain in a Ton-jon, (a sort of chair borne on mens' shoulders) and reached the summit about 6½ A. M. refreshed at every step by the bracing breeze, and not in the least fatigued by the removal. The hill air acted upon him like a charm. On the very first day, all the symptoms were relieved, his spirits gradually improved, and by means of a gentle course of mercurial medicines, until the mouth became slightly affected, but not to salivation, with a seton in the side, and mild nutrient diet, his general health was greatly restored; his strength had much increased, and the state of his stomach and bowels was also improved, tho' he was still subject to occasional attacks of spasm and obstruction of the colon. On the 1st of June, he was almost as completely re-established in health as he could have been by a trip to England, tho' of course the improvement cannot be expected to be permanent; and return to a hot climate will most likely be followed by a relapse.

I am inclined to attribute the successful issue of this case, entirely to the beneficial operation of the mountain air, as had he continued in the Valley, where the heat was then oppressively great, the thermometer being at 88° in the middle of the day, I have no doubt that he would have sunk from exhaustion."

The salutary effects of CHANGE OF AIR are supposed to be well known—but they are very imperfectly known, comparatively speaking. If, indeed, we reflect, for a moment, on the difference that must necessarily exist between the air of a city or a valley, and that of a mountain or open country, we must be convinced of the importance of this difference in respect to health. It is not only probable but certain, that all or most of the deleterious agents emanating from the earth on which we live, hover in the lower strata of air, and consequently become concentrated in the atmosphere of cities and valleys. As we ascend the mountains, we get beyond the reach of these agents; and on the open plains they are greatly diluted, if not dissipated, by the breezes which sweep uninterruptedly along the surface of the soil. But independently of these considerations, there is something so exhilarating and salutary in a constant change of the fluid by which "we live and move and have our being," that it is wonderful the wealthy citizens of these islands do not more frequently avail themselves of such a powerful preservative of life and health, than they now do! It is rather unfortunate that the mountains of Wales and Scotland are so far removed from Modern Babylon; but still the distance is trifling, when compared with the stock of health which a Summer or Autumnal tour confers on those who breathe the pure air of these places. We could illustrate this subject by many striking examples; but must defer the illustration for the present.

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## XXVIII.

### RETENTION OF URINE FROM ENLARGEMENT OF THE THIRD LOBE OF THE PROSTATE, TREATED BY ITS PERFORATION. By R. STAFFORD, Esq.

IN the analysis of Mr. Brodie's lectures on calculous diseases, published in the present number of this Journal, our readers will perceive that Mr. Brodie has perforated the third lobe of the prostate gland, for retention of urine occasioned by its enlargement. The eminent surgeon to whom we allude, recommends that, under certain circumstances, this operation should be performed. Mr. Stafford, whose little work on strictures has been formerly favourably noticed, has published two cases in which he performed this operation with success. As facts on such occasions are particularly valuable, we shall give an account of Mr. Stafford's cases.

*Case* 1. A gentleman, about 50 years of age, applied to Mr. Stafford with an impermeable stricture of the urethra, and slight enlargement of the prostate gland. It usually took him from two to four hours to empty the bladder, and he was subject to occasional attacks of retention of urine. Mr. Stafford gradually divided the stricture by means of the lancetted stilette, and in about *four months* the division was completed.

"After having permeated so great an extent of the urethra, the patient



was attacked by retention of urine, which could not, however, be called *complete*, as he was able to void, though with great straining and extreme pain, about a teaspoonful of urine during the day. The bladder now became considerably distended; the urine was extremely fetid; and at the bottom of the vessel which contained it, there was deposited a muco-purulent sediment tinged with blood. Having completely cleared the urethra down to the prostate gland, I examined, *per anum*, the state of this organ, and found it to be rather more enlarged than on the first examination, and that on pressure with the finger it was extremely tender. The pulse at this time was hard and at 90; the tongue very dry and furred; the skin hot; and the countenance full of distress and anxiety.

He was ordered, (November 25 and 26,) to lose blood from the perineum by leeches and cupping, to make use of the warm bath, to foment, to take purgatives and opiates, and to use the latter in injections and suppositories. All these means failed to produce any effect, and the bladder was becoming so distended that there was reason to fear that it might burst, or urinary coma might come on, unless it was punctured; or unless the operation, which shall presently be described was performed. At this crisis, therefore, I requested to have another opinion, and my friend, Mr. Lawrence, surgeon to St. Bartholomew's Hospital, was called. The catheter could at this time be passed to the length of 8½ inches; and on examining its point, *per anum*, it appeared to have entered into the anterior part, or mouth of the prostate, and there to be obstructed. In this state of the case Mr. L. concurred with me in thinking it would be best to cut on through the obstruction, which appeared to be an enlargement of the third lobe of the prostate, with the lancetted stilette, in as near a line as possible in the natural channel into the bladder. Having introduced the instrument, I thrust forth the lancet at its point, and cautiously perforated the obstruction, until I advanced nearly two inches farther. The stilette now was

eleven inches, but no urine flowed. It was therefore withdrawn, and a catheter was passed to the same point, but it would not go farther, until upon examination with the finger *per anum*, in order to discover its exact situation, it slipped into the bladder, and upwards of three pints of fetid urine were evacuated. In performing the operation the handle of the instrument was depressed as much as possible; and when the lancet which had made the cut had receded into its sheath, the blunt point was thrust in with the greatest caution until it had reached the extremity of the incision. The perforation was accomplished by protruding the lancet three times. The operation produced but little pain, and the bleeding was so trifling, that it could only be perceived by examining the point of the instrument. A No. 9 silver catheter was left in the bladder and secured, and the patient remained in bed. An opiate draught was administered. In the evening the pulse was reduced to 80—the skin had become moist, and the countenance had in a great measure lost the expression of anxiety."

We fancy that neither Mr. Stafford nor any body else will see many cases of retention so *complete*, that not a teaspoonful of urine is passed during the day. We cannot avoid remarking, en passant, that four months trial of the lancetted stilette, and retention of urine at the end of that time is no very great eulogium on the lancetted practice. For our own parts we believe that very few cases of stricture, very few indeed, but would yield in that time to the common means of dilatation, judiciously devised and dexterously executed. But this by the way.

We need not pursue the after details nor the after treatment. For a fortnight a gum catheter was kept in the bladder, and after this period it was withdrawn. In about three weeks after the operation he began to make water of his own accord, and in less than six he could completely empty the bladder. In January he returned into the country, and Mr. Stafford has since heard that he can void his urine as well as ever he did.

*Case* 2. A gentleman, aged 49, had laboured under symptoms of stricture for thirty years, with additional difficulty in passing his urine for five. The urine was alkaline, the bladder not completely evacuated. The natural orifice of the urethra was closed, but immediately beneath it was an opening connected with the canal. Half an inch anterior to the bulb was an impermeable stricture, and anterior to this a false passage which readily bled. The body of the prostate was slightly enlarged.

"After enlarging the orifice to its natural size, I gradually divided the diseased portion of the urethra, which extended about an inch and a half; and though in this case, as in the former, I proceeded with the greatest caution, for the reasons I have already mentioned, the operation was accomplished in four or five weeks. I found when I arrived at the prostate, that the instrument was still obstructed, and would not enter the bladder. The patient could make water in a larger stream; but he had still the same difficulty in expelling it, and the bladder never emptied itself. For these reasons, and as the catheter could be passed rather more than eight inches, and its point could be felt to have entered the prostatic portion of the urethra, I concluded this obstruction could be no other than an enlargement of the third or middle lobe; I therefore, as the symptoms were not very urgent, cautiously made three or four punctures in it. The patient felt some pain, and expressed himself as if something had been incised at the neck of the bladder. No bleeding ensued; and, indeed, so little did he suffer from it, that he felt no greater uneasiness than before the operation. In three days more I made the same number of punctures, which gave rise to exactly the same sensations at the time, but nothing more was felt. After the same interval of time, I again punctured the part, and on my fourth visit, my patient expressed himself considerably relieved. He could make water better, and he thought the bladder had gained more power. To ascertain the state of the urethra, I now introduced a steel sound, which passed easily into the bladder. On drawing off the urine afterwards, I discovered that the bladder could expel only half its contents. A catheter, therefore, was introduced night and morning, gradually increasing its size, until this organ completely regained its power. In about six weeks or two months the urinary organs of this patient were restored to their healthy function."

We think that, from the foregoing cases, as well as from those which are mentioned by Mr. Brodie, the puncture of an enlarged third lobe of the prostate, must be looked on under certain circumstances as a safe, if not an advisable operation. With respect to the lancetted stilette it would require much time, and many strong facts to enable us to pronounce a decided opinion on its advantages over the more ordinary means of dilatation for stricture. Of this we are certain, that Mr. Stafford employs it in many cases which might, and by other surgeons would, be successfully managed without it.

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## XXIX.

### EDINBURGH SURGICAL HOSPITAL.

1. REUNION OF FRACTURED BONES.*

MR. SYME continues to report from this his own hospital. We have on several occasions had occasion to praise and to blame these reports; to praise them as evincing assiduity and industry, to blame them for a spirit which, if not egotistical, might fairly give a colour to such an imputation. We know that it is the custom of most hospitals supported by voluntary contributions, to publish an annual or semi-annual report, setting forth their advantages to the community, their lists of patients relieved and cured. This is looked on with charitable feelings, and if a slight disposition to embellishment is noticed, it is not visited by any severity of criticism. But such a taint in a document intended for the profession, as a medical report in a medical journal undoubtedly must be, is not calculated to enhance nor even give their proper degree of value to its merits. We do not affirm that Mr. Syme's reports are characterized by this failing; we merely hint, that a superficial reader might be tempted to think them so. When Mr. S. informs us that, ever since the institution of the hospital, "it has been greatly resorted to for relief in cases of fracture, both by in and out patients," we cannot doubt that, when its merits become still more generally known than they now are, persons will voluntarily submit to fractures in order to partake of them. In this town individuals with broken legs are usually carried to the nearest hospital, and comparatively seldom *resort* of themselves to any one in particular. But probably no Metropolitan institution has acquired the deserved celebrity of Mr. Syme's. In the Edinburgh hospital, then, there have been no less than 17 cases of fracture during the last month, "when, it is true such accidents most abound, from the combined effect of intemperance and frosty weather." Of this long list two were fractures of the clavicle, three of the humerus, and two of the metatarsus and metacarpus. The remainder were fractures of the lower jaw, femur, patella, and tibia and fibula. We conceive that there are few of the larger London hospitals but would furnish as great a list in a fortnight or even in a week.

It is not our intention to notice this report at any length. Our readers are aware that many different accounts of the mode of re-union of broken bones have at various times been given to the world. The experiments of Dupuytren and Breschet, and of Mr. Howship have thrown much light upon the process, and established the important part which is played by the periosteum and soft parts. The following cases are valuable as bringing from human dissections proofs of the correctness of deductions from experiments on the lower animals.

* Ed. Med. and Surg. Journ. No. 107.

*Case* 1. A woman, æt. 52, was ad-

mitted with fracture of the right thigh-bone in its lower third. Pasteboard splints and the long splint of Dessault were applied, and she seemed to be doing well till the 11th day, when symptoms of fever came on, and on the 14th day she died apparently with œdema of the glottis.

"On dissection, the fracture was found to extend obliquely from near the middle of the bone down to the external condyle. The muscular fibres and cellular substance in the neighbourhood of the injury were altered in colour as well as consistence, by the effusion of gelatinous matter into their texture. A kind of bag or capsule was thus formed, embracing the whole extent of broken surfaces, and containing two or three ounces of fluid blood. The parietes composing it were in some parts connected to the very edge of the bone, but in others they became adherent to it at a distance of an inch or more from the extremity, leaving a space to this extent uncovered, and apparently denuded of periosteum. When carefully examined, this exposed portion was ascertained to be covered by a thin layer of gelatinous substance, which did not possess the toughness or other characters of a membrane; and the respective surfaces of the bone had a covering of the same kind. The medullary membrane was very vascular, and more distended than usual.

In examining the structure of this bag, I endeavoured to ascertain which of the natural tissues entered into its formation, and in what parts of it, if any, ossification had commenced. On tracing the periosteum from the sound bone, I found that where the bag adhered, that membrane became thick, and evidently continuous with its walls. It seemed probable that where the membrane had been stripped off the bone, as already mentioned, it might assist to form, in some small part, the sac in question; the great extent of which, however, was evidently constituted by the neighbouring tissues, whatever they happened to be, muscle, tendon, fat, or cellular substance, all being reduced to the same appearance internally, by vascularity of the surface, and the same consistence, by the interstitial effusion of organizable matter.

On introducing my finger into the bag, so as to feel if there were any indications of ossification, I perceived some small grains or specks of bone, which, when minutely examined, presented a stellated appearance, and were ascertained to lie in the substance of the capsular membrane. When examined in the same way near its connexion with the bone, it was found to contain much larger masses possessing osseous firmness; in order to ascertain the precise seat and origin of which, I carefully dissected the membrane where they existed, and then found that they lay completely imbedded within it, having a covering from it on both sides; also that they did not adhere to the bone, being separated from it by a thin layer of the membrane, so as to admit of a slight degree of motion; but at these parts, the shaft itself had begun to shoot out a growth of new bone."

*Case* 2. An old woman, æt. 70, was admitted with compound fracture of the left leg, close to the ankle. In the course of a month the cure seemed to be complete, and ten days after that the woman was dismissed with a perfectly straight limb. In the course of ten days from this time she died, and Mr. Syme was enabled to examine the bones.

"When divested of their muscular coverings, they presented an appearance hardly differing from that naturally belonging to them. All the pieces into which they had been broken were firmly united to each other and to their shafts, and were covered with a periosteum of usual consistence. On closer examination, the interstices between these portions were found to be occupied by a soft bloody gelatinous substance, to ascertain the precise extent of which, the preparation was macerated. When all the interstitial matter had been thus separated, it was seen that the united fragments of the tibia, which were thirteen in number, constituted merely a skeleton, so to speak, of the cylinder, and that the central cavity



remained entirely vacant. On examining the internal surface of this imperfect shell, it was evident that an ossific process had been going on over the whole of it, and I have no doubt, that, if the patient had lived some months longer, the bones would have become completely solid. The fibula presented similar appearances, though on a smaller scale, and the process of reunion was more nearly perfected. There is in my possession the preparation of a thigh-bone which was fractured through the neck and trochanters, and was treated by my friend Mr. George White. The patient died two months after the accident from some other cause. It now appears, the bone having been macerated, that all the broken portions are firmly united together at the edges, but that all their internal surfaces remain perfectly distinct and separate. The appearance, in short, is very nearly the same, and, I believe, would also have terminated in compact ossification, if the necessary time had been afforded."

### II. URINARY CALCULUS.

The following fact may be useful to others; it appears to have been instructive to Mr. Syme. Mr. S. extracted two large stones from a sac formed by dilatation of the membranous part of the urethra. Some uneasiness continued after the operation, which was referred to a stricture that had previously existed, but was not relieved as the stricture was dilated. Mr. S. now passed an instrument into the bladder, and found a stone in it. The parents would not permit him to remove it, but Mr. Syme has since heard that the calculus has been extracted by another surgeon. In short, by this little lapsus Mr. Syme lost his patient when he found the stone. Other surgeons may take the hint.

In similar cases Mr. Syme recommends us to divide the prostate, so as to admit the finger, and to make a complete scrutiny into every corner of the bladder. Thus a boy, æt. 3, was admitted with symptoms of stone. On introducing a sound, a calculus was felt lying in the prostatic part of the urethra, and it was removed. Mr. S. dilated the neck of the bladder with a bistoury, and introduced his finger so as to ascertain positively that there was no concretion in the bladder. The boy was dismissed cured in twelve days.

Mr. Syme relates a curious case in which he performed the operation of lithotomy. The man had suffered excessively from the symptoms of stone for nearly three years, and he was accustomed to take as much as sixty-two grains of opium for his daily dose. Mr. S. performed the operation, and for the first six days the patient did well, taking from six to eight hundred drops of laudanum daily. On the sixth day, however, it was thought better to begin to diminish the quantity of laudanum, and in the evening he complained of exhaustion and general uneasiness, the pulse having risen to 80, the tongue dry. Laudanum was prescribed, and next day he was rather better, but had a little mucous rattle in the chest. A little antimonial wine was added to the laudanum, and a blister applied. During the three next days he became progressively worse, another blister was applied, and on the third day he complained of violent pain in the left lumbar region. This continued till his death, on the following day. On dissection the lungs were found gorged with mucus; the descending colon was found extremely contracted, and these were all the morbid appearances. Mr. S. can say little explanatory of the case; neither can we.

In a case of retention of urine from a calculus at the bulb of the urethra, which could be felt through the integuments a little behind the scrotum, Mr. Syme adopted the following measures. He first dilated the passage after the manner of the Egyptians, that is, by blowing into it with a tube, having previously, to facilitate the passage of the stone, introduced a little oil. Then making pressure behind the calculus, he brought it forward to the anterior part of the scrotum, and, not being able to advance it further, he cut down upon it in that situation, and removed it. The boy was well in two or three days. In this patient Mr. Syme would not operate while the stone was pos-

terior to the scrotum, "because the parts are thick, and from their laxity favourable to the effusion both of blood and urine." Now it is a singular circumstance that Mr. Brodie has come to a diametrically opposite conclusion. Having removed several calculi by cutting into the urethra behind the scrotum with success, he was induced in one instance to bring the stone by the urethra-forceps anterior to the scrotum, and cut down upon it in that situation. The urine afterwards gravitated into the scrotum, troublesome abscesses succeeded, and from that time Mr. Brodie has always preferred cutting on the calculus behind the scrotum. By the way, we should imagine that a pair of urethra-forceps would have been much superior to the clumsy, albeit Egyptian, method of blowing up the canal.

III. CANCEROUS ULCERATIONS OF THE FACE.

Ulcers of the lip are sometimes prevented healing merely by the motion of the part, or the indirect irritation produced by disorder of the digestive organs, when pressure and a sulphate of zinc or black-wash is sufficient for the cure. Thus a farmer applied to Mr. Syme with a small superficial ulcer on the lip, nearly the size of a sixpence, which had resisted all the means already employed. Under the application of a piece of lint dipped in black-wash, covered by a piece of oil-silk, and supported by a bandage to prevent motion of the lip, the sore was diminished to half its former size in two or three days, and the farmer went into the country.

For cancerous affections of the tongue Mr. S. recommends the knife in preference to the ligature. Having removed a large ulcerated tumour of the tongue, nearly half of which was engaged in the disease, the wound healed, and all seemed doing well. Not long afterwards the complaint began to return, affecting not only the tongue but the floor of the mouth.

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XXX.

MERCURY AND DEPLETION IN THE FEVERS OF INDIA.

IN a very interesting and highly practical work on the climate, diseases, and topography of Pulo Penang, by Dr. Ward and Mr. Grant, we find the following statement, which shews that so late as the year 1830, the efficacy of the mercurial and depletive practice in Indian diseases, has lost nothing of its influence, notwithstanding the lachrymose ululations of certain old women in this country.

"In the European Patient depletion to a large extent is positively called for to save life: it therefore is a necessary evil. But in the native from his habits of body assimilating him more to these climes, the blood, which in him is always thinner than it is in the European, and which appears to be not so easily disorganized by noxious inhalations, can flow through all the extreme vessels without producing dangerous congestion, and that to such an extent only as can be removed without depletion, by means of antimonials, mercurials, and counter-irritants.

*Mercury.* In a brief way, touching upon the wonderful influence that Mercury (in whatever form administered so as to affect the system) exerts in putting an immediate check to this, as well as to all other acute intertropical maladies, I was induced, by perusing the works of that enlightened and elegant writer, Dr. James Johnson, who, it must be allowed, is the progenitor of the present active and extended system pursued in the treatment of tropical diseases, to be one of the happy followers of his doctrine. And it is to be hoped that all who follow his precepts will have equal gratification and success therefrom. In the first place, then, this medicine, whenever it produces a healthy action in the glands, more particularly in the Liver, subdues this fever; but extended practice must point out, that, in acute diseases, this rarely happens *till ptyalism is established*,—when the petroleum or tarlike dejections indicate that the gall-bladder has gorged forth its long inspissated and diseased tenant. There is little further use for its influence excepting to keep up a gentle action in the glands. The case of Lieut. C. is the only one in which I have seen life saved, in this fever, without its being through the medium of mercury carried to the length of ptyalism; and I look upon it to be a matter of the most essential importance to the welfare of our fellow sojourners in India, that this fact should be particularly enquired into. Facts are stubborn things; and I uphold my opinions on them alone. Some medical men suppose its influence is not required. I will conclude my remarks upon it with the words of that celebrated practitioner Dr. Chisholm on the administration of it in the malignant pestilential fever, p. 221. 'Are we then from vain and unfounded apprehensions of this kind, from reasoning drawn from false premises, or from the suggestions of uninformed or prejudiced minds, to yield up the result of our own frequently reiterated experience, to relinquish the best aid we can bring to the relief and support of our fellow creatures suffering under so direful a malady? forbid it humanity! forbid it truth! forbid it heaven!'"

From the foregoing extract it will be seen that certain anathemas thundered forth against mercury in the dangerous diseases of India, are but little regarded by those practitioners who can see with their own eyes, and are capable of drawing useful deductions from solid facts.

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XXXI.

ON THE INFLUENCE OF SOME OF THE DISEASES OF THE BODY ON THE MIND. By Sir HENRY HALFORD, Bt. M. D. &c. &c.

WE did not receive the little volume in which the above interesting paper is contained,* until after the Review department of this number was closed. We can only therefore notice one or two of the subjects in our Periscope of the present quarter. This is of less consequence, as the essays of the eminent President are quite unconnected by any link, except the place where they were read. They will therefore form separate articles of analysis, without any injury to the volume in which they are recorded. We have selected the fourth essay in the work for our present notice, because one of the most eloquent, and certainly not the least interesting, in the whole collection.

Sir George Baker, among others, has exercised his powers on the influence of some of the passions of the mind on the functions of the body. The object of Sir Henry is to furnish a counterpart of that picture—namely, the effects of bodily diseases on the mind. These effects are more obvious to the physician than to any other class of society—and they vary according to the different parts of the body in which the diseases or disorders have their seats.

"For what can be more in contrast with each other, in their influence upon the mental powers, than an indigestion and a slight inflammation of the brain? A disorder in the digestive organs lays a weight upon the mind.

'Corpus onustum
Hesternis vitiis animum quoque prægravat una,
Atque affigit humo divinæ particulam auræ.'
*Horace.*

It renders a man irresolute, infirm of purpose, and both indisposed and unequal to enterprise of any kind. Whilst a slight inflammation of the brain gives a sharpness* to his faculties, inspires spirit, quickens ambition, and leads him to believe, like Hotspur, that he can—

'Pluck bright honour from the pale-faced moon'

Perhaps if *excitement* were substituted for *inflammation* in the foregoing eloquent passage, it would be more generally applicable. In maniacs, for

* Essays and Orations read and delivered at the Royal College of Physicians. By Sir Henry Halford, 8vo. pp. 192, 1831.

* 'Multa enim e corpore existunt, quæ acuant mentem, multa quæ obtundant.'—Cic. Tusc. Lib. i. 33.

example, where these bright visions of the fancy go on for years, and after all, leave no traces of their existence in the brain, we cannot but conclude that it is irritation or excitement, rather than inflammation of the sensorium which keeps up the vivid trains of thought.

Of apoplexy our learned author professes to say little. Of the paralyses, the sequels of apoplexy, he presents us with the following sentiment.

"But the sequel of apoplexy is PALSY; and when that has supervened, and the frame has been dismembered, then, indeed, happy is the patient whose mind shall have been disciplined when in health, and whose moral habits shall have been well regulated by reason and by good principles before he was taken ill; for, otherwise, as all the passions are let loose by the malady, (as is the case in many instances, at least, in this disease,) whilst the controlling power is enfeebled, an irritability succeeds which makes life intolerable to the sick man himself, and to all around him. The tenderest offices, administered with the most prudent attention and care, fail to conciliate; and he indulges his anger, and dissolves into tears alternately, alike without reason, until at length another apoplectic blow deprives him of life.

By this distemper the great talents of Marlborough were confounded in the latter years of his life, and his powerful mind impaired. By this also was extinguished the spirit of the celebrated Dean Swift:—

'From Marlboro's eyes the tears of dotage flow,
And Swift expires a driveller and a show.'"

In respect to epilepsy, it is a merciful dispensation of Providence that, however frightful the attack may appear to others, the victim himself is unconscious of the seizure. But it is too well known that repeated fits debilitate the mental faculties, and even lead to fatuity. Sir Henry is of opinion that Julius Cæsar's epilepsy was symptomatic of some derangement in the alimentary canal; as it did not seem to impair his faculties.

The next contrast which our author draws is that which the young hectic female presents as compared with that disordered state which sometimes occurs after the cessation of the catamenia.

"The subject of such an indisposition has probably grown more corpulent; she sits in an indolent posture, looks gloomy, hardly speaks at all, and we learn from her attendants that she lives under a constant apprehension that some fancied evil is about to befal her. She is suspicious, undecided in all her movements, and manifests symptoms which *differ in degree only* from melancholy mania.

The pathologist will look, perhaps, to the different state of the circulation of the blood in these two females for the difference of their animal spirits; and will conjecture that the blood was more oxygenated in the younger one, by a more rapid circulation through the lungs, whereby the brain was unusually stimulated; whereas, in the elder person, there was a stagnation in the liver, giving rise to hypochondriasm, in consequence of the more gorged, plethoric state of the ventral and haemorrhoidal veins determined to that organ, since the sexual evacuation had ceased."

The agonizing paroxysms of suffocation occasioned by organic diseases of the heart are next sketched in the energetic language of the author. In the intervals between the attacks (of angina pectoris) the mind is often cheerful and buoyant, and the patient indulges sanguine hopes.

"Hence, the subjects of such painful disorders are commonly less dejected than those who suffer only from a derangement of the stomach. Whether it be that Providence has specially allotted a certain alacrity of spirit and cheer of mind to the victims of this disease of the main-spring of life, as an alleviation of their sufferings, or whether this may be referred to the general principle which Dr. Paley has stated with respect to pain, 'that its pauses and intermissions become positive pleasures; that it has the power of shedding a satisfaction over the intervals of ease which few enjoyments exceed.' This amiable philosopher adds, that 'the spirits of sick men do not sink in



cient for the process, as it will detect the 100th part of a grain of gamboge. If great expedition be required, alcohol may be used at first to dissolve the colouring matter, and thus the tedious evaporation will be avoided.

If the *yellocs*, when washed with water, and the comfits removed, let fall a yellow deposit, and leave the supernatant liquid colourless and transparent, the deposit is either the chromate of lead, Naples yellow *(oxide of lead and antimony)*, massicot (or the yellow oxide of lead), or, finally, a vegetable lake of alumina or lime. In most cases also, the precipitate contains sulphate of lime.

We can now readily gain a clue to which of these divisions it belongs, by the following simple system of trial tests, viz. by placing a minute portion of it, moistened with a small drop of distilled water on a thin slip of mica,* and holding it over the flame of a spirit lamp till it be heated to redness. If it be a vegetable lake of lime or alumina, it first chars, blackens, exhales smoke, and then leaves a brilliant, white, soft, earthy mass, entirely soluble in acetic acid when transferred to a watch crystal. A portion of this mass, if lime, stains moistened turmeric paper red; if alumina, has no such effect.

If, instead of charring and becoming white, the spot becomes red, and is surrounded with a little yellow circle, the colouring is massicot or yellow lead.

If, during this operation, dense white fumes are evolved, and leave a copious circle of the same colour on the mica, the substance, besides lead, *probably* contains antimony, and is, therefore, the Naples yellow.

If the colouring matter be chromate of lead, beautiful phenomena mark the action of heat, accomplished in the manner I describe; the substance on trial first darkens in colour, then shows a red surface, and by and by bright-green spots are seen mingled with the red. This contrast of colours becomes especially striking on the addition of a drop of water.

So far the experiments are trial tests, and may be performed in as short a time as it takes to read their description; our next object is to obtain unimpeachable evidence; this, in the case of the massicot, is acquired readily, by treating a grain or two of the yellow mass on a watch-glass with ten drops of nitric and six of muriatic acid, aiding the action by the momentary application of heat, white flakes of the chloride of lead now form and float on the acids; they are to be removed with a capillary tube, and transferred to a bit of firm charcoal, by directing the blowpipe flame on the cloride, it instantly fuses, and disengages globules of metallic lead, surrounded by concentric circles of red and yellow.

If the evolution of dense white fumes indicate the presence of antimony, the yellow matter should be treated, as just now described, with nitric and muriatic acid. The chloride of lead should be removed, and a few drops of distilled water poured on the residual fluid previously evaporated to dryness. If antimony be present in the smallest quantity, a white precipitate remains, which, if exposed to a current of sulphuretted hydrogen, expelled from a small bladder, furnished with a tube and stop cock, is converted into the orange-red sulphuret of antimony. The chloride of lead is then to be reduced by the blowpipe as before, and we have thus certain evidence of the presence of antimony and lead. Half a grain of the Naples yellow is sufficient for this chain of experiments.

If on the mica, green spots are mixed with the red, indicating chromate of lead, two or three grains of the remaining yellow matter should be fused for a quarter of an hour on a slip of mica, with an equal quantity of nitrate of potash, chromate of potash is thus formed, the green spots disappear, and red flocks of minium, or the red oxide of lead, are seen in the fused nitre. The fusion should now be discontinued, and the cooled mass dissolved in distilled water on a watch-glass; the solu-

* Mica can be procured at the mineralogists' shops at a very cheap rate, it is of immense service in minute analyses of this kind. (See LANCET, No. 396.)

tion should then be separated from the red oxide by a capillary tube, and transferred to another crystal. Nitrate or acetate of lead will now occasion in it a precipitate of the yellow chromate of lead. The red flocks are to be heated with nitro-muriatic acid, and the resulting chloride of lead reduced on charcoal to the metallic state.

The protracted fusion of the nitrate of potash may be easily accomplished, by placing a slip of mica four inches long and two broad, over the mouth of a wine glass, so that it can be balanced by a shilling placed on it over the glass; about two inches thus project, beneath which is placed a spirit lamp, and the fusion may be kept up an unlimited length of time. To those unprovided with costly apparatus, this simple substitute may prove, as it has to me, of considerable value.

ANALYSIS OF THE RED.

The red, on being washed or boiled with water, either form a coloured transparent solution, which affords no deposit, and filters through paper, or is coloured and affords a deposit, or affords a dense deposit, and leaves the fluid transparent and colourless.

In the first case, the solution is entirely decolorized by chlorine, or by dropping in a particle of the chloride of lime. If a second portion of it be changed to orange-yellow by sulphuric acid, and a third assume a violet with ammonia, and if no black colour is produced by adding the sulphate of iron, it may be concluded to be a solution of *cochineal*.

If a deposit takes place, which, when dried and heated on mica, chars, blackens, and finally becomes white, and the residuum soluble in acetic acid, it is a vegetable lake of alumina or lime, probably carmine.

If the deposit be a bright-red colour, and subside rapidly, it is probably either the red oxide of lead, or the sulphuret of mercury; in either case heat on mica; if the former, the colour remains unchanged, and the substance is permanent at a red heat. If the latter, it is darkened on the slightest application of heat; if then removed, it regains on cooling a brilliant vermilion colour. This alternate blackening and reddening may be repeated *ad libitum*, till it is finally volatilised, leaving no trace behind.

So far, as in the analysis of the yellows, the experiments are but trial tests: The reduction of the respective metals is next to be accomplished. This is easily effected, by boiling a few particles of the colouring matter in nitro-muriatic acid. If the trial test has pointed out the sulphuret of mercury, on evaporating nearly to dryness, brilliant crystals form on the watch-glass, these should be redissolved in a few drops of distilled water, acidulated with nitric acid, and a gold ring with a bit of thin iron wire introduced. If the colouring matter contains the one-thousandth part of a grain of mercury, it will be thus deposited on the gold as a white amalgam.

If the red colour was permanent on the mica, the colouring matter is to be heated with nitro-muriatic acid as before described, and reduced on charcoal to the state of metallic lead."

The author, urged by a sense of public duty, laid the present subject before the Home Secretary; but how far his representations may lead to any legislative measures, is uncertain — or rather, we may safely say, hopeless. The members of Government, in this country, are too deeply immersed in political contests, to pay much heed to the public health — a subject which has always been neglected by our legislature, even upon much more important points than confectionary. It appears that the only enactments respecting the SALUS PUBLICA, which Coleridge thought worthy of insertion in the latest edition of Blackstone's Commentaries, are those which enforce the observance of quarantine, which prohibit the *adulteration of wine*, the sale of unwholesome meat —*or meat bought of a Jew!* It is surely a monstrous shame that the poor Hebrew should not be allowed to sell his pork, seeing that he can make no use of it in his own kitchen!

Dr. O'Shaughnessy is evidently a clever chemist, and his industry appears equal to this talent in this department of human knowledge.

# STATISTICAL TABLES

OF THE

# ROYAL INFIRMARY OF EDINBURGH:

FOURTH SERIES,

FROM 1st JULY 1843 TO 30th SEPTEMBER 1844.

BEING AN

APPENDIX TO THE REPORT OF THE MANAGERS FOR THE YEAR 1844.

COMPILED BY

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EDINBURGH:

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M.DCCC.XLV.

*The same plan has been followed in this as in the Reports drawn up by my predecessors. It differs only in not containing tables of individual diseases. These have been omitted, because they afford little additional information to what may be gathered by a reference to each disease in Table I. The other Tables formerly comprehended in the Medical Report will be found in the General Statement, to which this is an Appendix.*

*J. H. B.*



## TABLE I.

PATIENTS treated in the ROYAL INFIRMARY between the 1st of JULY 1843 and the 30th of SEPTEMBER 1844, inclusive, arranged according to their DISEASES.

| DISEASES. | Total Males and Females. | MALES. | | | | | | FEMALES. | | | | | | Average Residence in Hospital. — Days. | Mortality per Cent. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Total Males. | Cured. | Relieved. | Advice, Desire, or no Change. | Irregular or Improper. | Died. | Total Females. | Cured. | Relieved. | Advice, Desire, or no Change. | Irregular or Improper. | Died. | | Males. | Fem. |
| FEVER— | | | | | | | | | | | | | | | | |
| Continued, . . . | 4642 | 2294 | 2080 | 2 | 8 | 5 | 189 | 2358 | 2173 | 2 | 8 | 3 | 172 | 25 | 8·27 | 7·29 |
| Intermittent, . . . | 3 | 2 | 2 | ... | ... | ... | ... | 1 | 1 | ... | ... | ... | ... | 25 | ... | ... |
| Total Fevers, . . . | 4645 | 2296 | 2082 | 2 | 8 | 5 | 189 | 2359 | 2174 | 2 | 8 | 3 | 172 | ... | ... | ... |
| OF NERVOUS SYST. | | | | | | | | | | | | | | | | |
| Hydrocephalus, . . | 2 | 1 | ... | ... | ... | ... | 1 | 1 | ... | ... | ... | ... | 1 | 7 | | |
| Cephalalgia, . . . | 10 | 6 | 3 | 3 | ... | ... | ... | 4 | 4 | ... | ... | ... | ... | 16 | | |
| Apoplexy, . . . . | 4 | 2 | ... | ... | ... | ... | 2 | 2 | ... | ... | ... | ... | 2 | 10 | | |
| Asphyxia, . . . . | 3 | ... | ... | ... | ... | ... | ... | 3 | 2 | ... | ... | ... | 1 | 5 | | |
| Delirium c. Tremore, | 34 | 26 | 15 | ... | ... | ... | 11 | 8 | 5 | 1 | 1 | ... | 1 | 14 | | |
| Disease of Brain, . . | 25 | 15 | 5 | 2 | ... | 1 | 7 | 10 | 2 | 1 | 1 | ... | 4 | 28 | | |
| Hemiplegia, . . . | 6 | 3 | ... | 3 | ... | ... | ... | 3 | ... | 1 | 1 | ... | 1 | 26 | | |
| Paralysis, . . . . | 15 | 10 | 2 | 5 | 2 | ... | 1 | 5 | ... | 2 | 1 | ... | 2 | 30 | | |
| Spasms, . . . . | 4 | 2 | 1 | ... | 1 | ... | ... | 1 | 1 | ... | ... | ... | ... | 55 | | |
| Paralysis Partialis, . | 8 | 6 | 5 | 1 | ... | 1 | ... | 2 | 1 | 1 | ... | ... | ... | 42 | | |
| Paraplegia, . . . . | 11 | 8 | 1 | 4 | 2 | ... | 1 | 3 | ... | 2 | ... | ... | 1 | 61 | | |
| Hysteria, . . . . | 22 | ... | ... | ... | ... | ... | ... | 22 | 15 | 4 | 2 | ... | 1 | 37 | | |
| Spinal Cord, . . . | 2 | 1 | 1 | ... | ... | ... | ... | 1 | ... | ... | 1 | ... | ... | 129 | | |
| Spinal Irritation, . . | 7 | ... | ... | ... | ... | ... | ... | 7 | 2 | 5 | ... | ... | ... | 22 | | |
| Epilepsy, . . . . | 15 | 8 | 2 | 5 | ... | ... | 1 | 7 | ... | 2 | 1 | ... | 1 | 35 | | |
| Chorea, . . . . | 4 | 1 | 1 | ... | ... | ... | ... | 3 | 2 | 1 | ... | ... | ... | 26 | | |
| Hypochondriasis, . . | 4 | 4 | ... | ... | 3 | ... | ... | ... | ... | ... | ... | ... | ... | 16 | | |
| Mania, . . . . | 19 | 6 | 2 | 1 | 2 | ... | 1 | 13 | 4 | 3 | 5 | 1 | 3 | 25 | | |
| Puerperal Mania, . | 1 | ... | ... | ... | ... | ... | ... | 1 | ... | ... | 1 | ... | ... | 32 | | |
| Neuralgia, . . . . | 20 | 12 | 5 | 6 | 1 | ... | ... | 8 | 4 | 2 | 1 | ... | ... | 37 | | |
| Total Nervous System, | 216 | 111 | 44 | 31 | 12 | 2 | 22 | 105 | 46 | 32 | 12 | 1 | 20 | ... | 22·52 | 19·04 |
| OF RESPIRATORY ORGANS— | | | | | | | | | | | | | | | | |
| Chr, Laryngitis, . . | 3 | ... | ... | ... | ... | ... | ... | 3 | 1 | 2 | ... | ... | ... | 31 | | |
| Tracheitis, . . . . | 1 | 1 | ... | ... | ... | ... | 1 | ... | ... | ... | ... | ... | ... | 3 | | |
| Bronchitis, . . . . | 79 | 35 | 27 | 5 | ... | 1 | 2 | 44 | 29 | 6 | 3 | ... | 6 | 21 | | |
| Chr. Bronchitis, . . | 57 | 37 | 12 | 13 | ... | 1 | 6 | 20 | 11 | 5 | ... | ... | 1 | 22 | | |
| Pneumonia, . . . | 31 | 22 | 10 | 1 | 1 | ... | 8 | 9 | 4 | ... | ... | ... | 5 | 23 | | |
| Phthisis, . . . . | 133 | 81 | 1* | 26 | 17 | ... | 33 | 52 | ... | 21 | 6 | ... | 25 | 55 | | |
| Disease of Lungs, kind not stated, } | 2 | 1 | ... | ... | ... | ... | 1 | 1 | 1 | ... | ... | ... | ... | 22 | | |
| Emphysema Pulmon, | 6 | 5 | 1 | 2 | 1 | ... | 1 | 1 | 1 | ... | ... | ... | ... | 23 | | |
| Pleuritis, . . . . | 23 | 14 | 8 | 1 | 3 | ... | 2 | 11 | 8 | ... | ... | ... | 3 | 26 | | |
| Hæmoptysis, . . . | 8 | 5 | 3 | 2 | ... | ... | ... | 3 | 2 | ... | 1 | ... | ... | 25 | | |
| Catarrh, . . . . | 21 | 14 | 10 | 2 | 1 | 1 | ... | 7 | 6 | 2 | 1 | ... | ... | 12 | | |
| Asthma, . . . . | 2 | 2 | ... | 1 | ... | 1 | ... | ... | ... | ... | ... | ... | ... | 11 | | |
| Pertussis, . . . . | 4 | 4 | 1 | 2 | 1 | ... | ... | ... | ... | ... | ... | ... | ... | 22 | | |
| Total Resp. Organs, . | 372 | 216 | 73 | 59 | 24 | 3 | 57 | 156 | 76 | 38 | 10 | ... | 32 | ... | 26·43 | 24·35 |
| OF ORGANS OF CIRCULATION— | | | | | | | | | | | | | | | | |
| Pericarditis, . . . | 1 | 1 | ... | 1 | ... | ... | ... | ... | ... | ... | ... | ... | ... | 21 | | |
| Disease of Heart, . | 87 | 54 | 37 | 20 | 7 | ... | 25 | 33 | 3 | 11 | 4 | ... | 15 | 34 | | |
| Aneurism of Aorta, . | 8 | 5 | ... | 3 | 2 | ... | 3 | 3 | ... | ... | ... | ... | 1 | 37 | | |
| ——— External, . | 4 | 3 | 2 | ... | 1 | ... | ... | 1 | ... | ... | ... | ... | 1 | 25 | | |
| Varicose Veins, . . | 1 | 1 | 1 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 24 | | |
| Phlebitis, . . . . | 2 | 2 | 1 | ... | ... | 1 | ... | ... | ... | ... | ... | ... | ... | 63 | | |
| Total Organs of Circulation, . . . | 103 | 66 | 41 | 24 | 10 | ... | 28 | 37 | 3 | 11 | 4 | ... | 18 | ... | 42·64 | 48·57 |

* Reported cured. † Reported cured.

TABLE I.—PATIENTS Treated in the ROYAL INFIRMARY between the 1st of July 1843 and the 30th of September 1844, inclusive, arranged according to their DISEASES,—*Continued.*

| DISEASES. | Total Males and Females. | MALES. | | | | | | FEMALES. | | | | | | Average Residence in Hospital. | Mortality per Cent. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Total Males. | Cured. | Relieved. | Advice, Desire, or no Change. | Irregular or Improper. | Died. | Total Females. | Cured. | Relieved. | Advice, Desire, or no Change. | Irregular or Improper. | Died. | Days. | Males. | Fem. |
| OF ORGANS OF DIGESTION— | | | | | | | | | | | | | | | | |
| Tonsilitis, | 14 | 4 | 4 | ... | ... | ... | ... | 10 | 8 | 2 | ... | ... | ... | 12 | | |
| Parotitis, | 1 | ... | ... | ... | ... | ... | ... | 1 | 1 | ... | ... | ... | ... | 5 | | |
| Stricture of Esophagus, | 3 | 3 | 1 | ... | ... | 1 | 1 | ... | ... | ... | ... | ... | ... | 17 | | |
| Peritonitis, | 11 | 2 | ... | ... | ... | ... | 2 | 9 | 4 | ... | 1 | ... | 4 | 27 | | |
| Chr. Peritonitis, | 1 | 1 | ... | 1 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | | |
| Ascites, | 14 | 2 | ... | 1 | ... | ... | 1 | 12 | 4 | 3 | 2 | ... | 3 | 30 | | |
| Gastritis, | 6 | 5 | 4 | 1 | ... | ... | ... | 1 | 1 | ... | ... | ... | ... | 43 | | |
| Disease of Stomach, | 6 | 3 | ... | 1 | ... | ... | 2 | 3 | ... | 1 | ... | ... | 2 | 25 | | |
| Enteritis, | 9 | 3 | 3 | ... | ... | ... | ... | 6 | 1 | ... | ... | ... | 1 | 21 | | |
| Gastro-Enteritis, | 1 | ... | ... | ... | ... | ... | ... | 1 | ... | ... | ... | ... | 1 | ... | | |
| Dysentery, | 11 | 7 | 4 | 1 | ... | ... | 2 | 4 | 4 | ... | ... | ... | ... | 32 | | |
| Diarrhœa, | 18 | 11 | 11 | ... | ... | ... | ... | 7 | 1 | 2 | ... | ... | 4 | 14 | | |
| Colica, | 3 | 1 | 1 | ... | ... | ... | ... | 2 | 1 | 1 | ... | ... | ... | 4 | | |
| Hepatitis, | 9 | 4 | 2 | ... | ... | ... | 2 | 5 | 3 | ... | ... | ... | 2 | 68 | | |
| Organic Disease of Liver, | 18 | 8 | 2 | 1 | ... | ... | 5 | 10 | 2 | 4 | ... | ... | 4 | 31 | | |
| Icterus, | 8 | 4 | 2 | 1 | ... | ... | 1 | 4 | 4 | ... | ... | ... | ... | 26 | | |
| Dyspepsia, | 60 | 31 | 12 | 14 | 3 | ... | ... | 29 | 18 | 7 | 4 | ... | ... | 16 | | |
| Hernia, | 7 | 4 | 2 | 2 | ... | ... | ... | 3 | 2 | ... | ... | ... | 1 | 19 | | |
| Ulcerated Throat, not Syphilitic, | 8 | 2 | 2 | ... | ... | ... | ... | 6 | 3 | 1 | 2 | .. | ... | 19 | | |
| Constipation, | 21 | 8 | 8 | ... | ... | ... | ... | 13 | 11 | ... | 2 | ... | ... | 5 | | |
| Disease of Spleen, | 2 | 2 | 2 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 24 | | |
| Hæmatemesis, | 4 | ... | ... | ... | ... | ... | ... | 4 | 2 | 1 | ... | ... | 1 | 17 | | |
| Disease of Abdomen, | 3 | 2 | ... | 2 | ... | ... | ... | 1 | ... | 1 | ... | ... | ... | 10 | | |
| Total ORGANS OF DIGESTION, | 238 | 112 | 60 | 25 | 5 | 1 | 21 | 126 | 69 | 23 | 11 | ... | 23 | ... | 18·75 | 18·25 |
| OF GENITO-URINARY ORGANS— | | | | | | | | | | | | | | | | |
| Nephritis, | 3 | 1 | 1 | ... | ... | ... | ... | 2 | 1 | 1 | ... | ... | ... | 49 | | |
| Granular Disease of Kidney, | 37 | 22 | 3 | 7 | 3 | ... | 9 | 15 | 1 | 6 | 1 | ... | 7 | 33 | | |
| Metritis, | 1 | ... | ... | ... | ... | ... | ... | 1 | 1 | ... | ... | ... | ... | 41 | | |
| Leucorrhœa, | 10 | ... | ... | ... | ... | ... | ... | 10 | 5 | 3 | ... | 2 | ... | 23 | | |
| Disease of Ovary, | 4 | ... | ... | ... | ... | ... | ... | 4 | ... | 2 | 2 | ... | ... | 42 | | |
| Tumours of Uterus, | 10 | ... | ... | ... | ... | ... | ... | 10 | 2 | 2 | 2 | ... | 4 | 37 | | |
| Amenorrhœa, | 14 | ... | ... | ... | ... | ... | ... | 14 | 6 | 3 | 3 | 2 | ... | 29 | | |
| Menorrhagia, | 4 | ... | ... | ... | ... | ... | ... | 4 | 3 | ... | 1 | ... | ... | 39 | | |
| Disease of Bladder and Prostate, | 4 | 4 | ... | 1 | 2 | ... | 1 | ... | ... | ... | ... | ... | ... | 11 | | |
| Chr. Cystitis, | 4 | 3 | 1 | 1 | 1 | ... | ... | 1 | ... | ... | 1 | ... | ... | 34 | | |
| Calculus Vesicæ, | 5 | 5 | 5 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 32 | | |
| Stricture of Urethra, | 13 | 13 | 10 | 1 | 2 | ... | ... | ... | ... | ... | ... | ... | ... | 29 | | |
| Retention of Urine, | 7 | 6 | 3 | 1 | 2 | ... | ... | 1 | 1 | ... | ... | ... | ... | 18 | | |
| Incontinence of, | 1 | 1 | ... | 1 | ... | ... | ... | ... | ... | ... | ... | ... | ... | 23 | | |
| Fistula in Perinæo, | 9 | 7 | 3 | 3 | ... | ... | 1 | 2 | 2 | ... | ... | ... | ... | 65 | | |
| Orchitis, | 6 | 6 | 6 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 34 | | |
| Disease and Chr. Enlargement of Testis, | 5 | 5 | 4 | 1 | ... | ... | ... | ... | ... | ... | ... | ... | ... | 20 | | |
| Hydrocele, | 29 | 29 | 23 | 5 | ... | ... | 1 | ... | ... | ... | ... | ... | ... | 27 | | |
| Varicocele, | 2 | 2 | ... | 2 | ... | ... | ... | ... | ... | ... | ... | ... | ... | 8 | | |
| Gonorrhœa, | 5 | 5 | 4 | ... | 1 | ... | ... | ... | ... | ... | ... | ... | ... | 12 | | |
| Primary Syphilis, | 19 | 16 | 14 | ... | 2 | ... | ... | 3 | 1 | ... | 1 | ... | 1 | 22 | | |
| Secondary ——— | 63 | 51 | 27 | 14 | 4 | 4 | 2 | 12 | 6 | 3 | 2 | 1 | ... | 40 | | |
| Disease of Scrotum, | 1 | 1 | ... | 1 | ... | ... | ... | ... | ... | ... | ... | ... | ... | 102 | | |
| Hæmaturia, | 2 | 2 | 2 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 27 | | |
| Total GENITO-URINARY ORGANS, | 258 | 179 | 106 | 38 | 17 | 4 | 14 | 79 | 29 | 20 | 13 | 5 | 12 | ... | 7·82 | 15·19 |



TABLE I.—PATIENTS treated in the ROYAL INFIRMARY between the 1st of July 1843 and the 30th of September 1844, inclusive, arranged according to their DISEASES,—*Continued.*

| DISEASES. | Total Males and Females. | MALES. | | | | | | FEMALES. | | | | | | Average Residence in Hospital. | Mortality per Cent. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Total Males. | Cured. | Relieved. | Advice, Desire, or no Change. | Irregular or Improper. | Died. | Total Females. | Cured. | Relieved. | Advice, Desire, or no Change. | Irregular or Improper. | Died. | Days. | Males. | Fem. |
| MISCELLANEOUS— | | | | | | | | | | | | | | | | |
| Anasarca and General Dropsy, | 25 | 13 | 7 | 2 | 1 | ... | 3 | 12 | 10 | 1 | ... | 1 | ... | 16 | | |
| Purpura, | 2 | 1 | 1 | ... | ... | ... | ... | 1 | 1 | ... | ... | ... | ... | 25 | | |
| Scrofula, | 11 | 5 | 3 | 1 | 1 | ... | ... | 6 | 4 | 1 | 1 | ... | ... | 56 | | |
| Acute Rheumatism, | 91 | 48 | 39 | 5 | 3 | ... | 1 | 43 | 39 | 3 | ... | ... | 1 | 29 | | |
| Chronic ——— | 79 | 44 | 25 | 17 | 1 | 1 | ... | 36 | 12 | 11 | 1 | 2 | ... | 43 | | |
| Pleurodynia, | 14 | 5 | 5 | ... | ... | ... | ... | 9 | 7 | 1 | ... | 1 | ... | 18 | | |
| Diabetes, | 7 | 5 | ... | 3 | ... | ... | 2 | 2 | ... | 1 | ... | ... | 1 | 124 | | |
| Poisoning, | 5 | 1 | ... | ... | 1 | ... | ... | 4 | 2 | ... | ... | ... | 2 | 8 | | |
| Drunkenness, | 14 | 9 | 5 | 1 | ... | 2 | 1 | 5 | 4 | ... | ... | 1 | ... | 3 | | |
| Inanition and Debility, | 22 | 12 | 4 | 5 | 1 | ... | 2 | 10 | 6 | 2 | 1 | ... | 1 | 15 | | |
| Bronchocele, | 1 | 1 | 1 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 46 | | |
| Nævus, | 2 | 1 | ... | ... | ... | ... | 1 | 1 | 1 | ... | ... | ... | ... | 17 | | |
| Total MISCELLANEOUS— | 264 | 145 | 89 | 34 | 8 | 3 | 11 | 119 | 86 | 20 | 3 | 5 | 5 | ... | 7·58 | 4·20 |
| OF THE INTEGUMENTARY SYSTEM, INCLUDING FEBRILE ERUPTIONS— | | | | | | | | | | | | | | | | |
| Scabies, | 13 | 10 | 6 | 1 | 3 | ... | ... | 3 | 2 | 1 | ... | ... | ... | ... | | |
| Eczema, | 10 | 4 | 2 | 1 | 1 | ... | ... | 6 | 3 | 3 | ... | ... | ... | .. | | |
| Porrigo, | 13 | 9 | 8 | 1 | ... | ... | ... | 4 | 2 | 2 | ... | ... | ... | ... | | |
| Lepra, | 11 | 8 | 4 | 3 | 1 | ... | ... | 3 | 1 | 1 | 1 | ... | ... | ... | | |
| Elephantiasis, | 2 | 2 | ... | ... | 1 | 1 | ... | ... | ... | ... | ... | ... | ... | ... | | |
| Impetigo, | 1 | 1 | ... | 1 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | | |
| Psoriasis, | 5 | 2 | 2 | ... | ... | ... | ... | 3 | 3 | ... | ... | ... | ... | ... | | |
| Lupus, | 3 | 2 | 1 | 1 | ... | ... | ... | 3 | 2 | 1 | ... | ... | ... | ... | | |
| Rhagas, | 1 | 1 | 1 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | | |
| Urticaria, | 1 | ... | ... | ... | ... | ... | ... | 1 | 1 | ... | ... | ... | ... | ... | | |
| Pemphigus, | 1 | ... | ... | ... | ... | ... | ... | 1 | 1 | ... | ... | ... | ... | ... | | |
| Herpes, | 2 | ... | ... | ... | ... | ... | ... | 2 | 2 | ... | ... | ... | ... | ... | | |
| Kind not stated, | 11 | 7 | 5 | 2 | ... | ... | ... | 4 | 3 | 1 | ... | ... | ... | 48 | | |
| Variola, | 13 | 5 | 4 | ... | ... | ... | 1 | 8 | 7 | ... | ... | ... | 1 | } 20 | | |
| Rubeola, | 8 | 2 | 2 | ... | ... | ... | ... | 6 | 6 | ... | ... | ... | ... | | | |
| Scarlatina, | 10 | 6 | 6 | ... | ... | ... | ... | 4 | 4 | ... | ... | ... | ... | | | |
| Erythema, | 4 | 1 | 1 | ... | ... | ... | ... | 3 | 2 | ... | 1 | ... | ... | 30 | | |
| Erysipelas, | 32 | 18 | 14 | 3 | ... | ... | 1 | 14 | 14 | ... | ... | ... | ... | 18 | | |
| Diffuse Inflammation of cellular membrane, | 1 | 1 | ... | ... | ... | ... | 1 | ... | ... | ... | ... | ... | ... | 4 | | |
| Paronychia and Onychia, | 6 | 4 | 4 | ... | ... | ... | ... | 2 | 2 | ... | ... | ... | ... | 24 | | |
| Carbuncle, | 3 | 1 | 1 | ... | ... | ... | ... | 2 | 2 | ... | ... | ... | ... | 16 | | |
| Total INTEG. SYST. | 153 | 84 | 61 | 13 | 6 | 1 | 3 | 69 | 57 | 9 | 2 | ... | 1 | ... | ... | ... |
| OF THE EYE— | | | | | | | | | | | | | | | | |
| Conjunctivitis, | 16 | 4 | 3 | 1 | ... | ... | ... | 12 | 10 | 1 | 1 | ... | ... | | | |
| Cornealis and Sclerotitis, | 3 | 2 | ... | ... | 2 | ... | ... | 1 | 1 | ... | ... | ... | ... | | | |
| Iritis, | 9 | 7 | 3 | 2 | 2 | ... | ... | 2 | 2 | ... | ... | ... | ... | | | |
| Kind not stated, | 4 | 3 | 2 | 1 | ... | ... | ... | 1 | 1 | ... | ... | ... | ... | 40 | | |
| Strabismus, | 1 | 1 | 1 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | | | |
| Amaurosis, | 6 | 5 | 1 | 1 | 2 | 1 | ... | 1 | ... | 1 | ... | ... | ... | | | |
| Cataract, | 15 | 11 | 4 | 4 | 3 | ... | ... | 4 | 2 | 1 | 1 | ... | ... | | | |
| Organic Disease, | 2 | 1 | 1 | 1 | ... | ... | ... | 1 | ... | ... | 1 | ... | ... | | | |
| Fistula Lachrymalis, | 1 | ... | ... | ... | ... | ... | ... | 1 | 1 | ... | ... | ... | ... | | | |
| Total of the EYE, | 64 | 41 | 18 | 12 | 10 | 1 | ... | 23 | 17 | 3 | 3 | ... | ... | ... | ... | ... |

TABLE I.—PATIENTS treated in the ROYAL INFIRMARY between the 1st of July 1843 and the 30th of September 1844, inclusive, arranged according to their DISEASES,—*Continued.*

| DISEASES. | Total Males and Females. | MALES. Total Males. | Cured. | Relieved. | Advice, Desire, or no Change. | Irregular or Improper. | Died. | FEMALES. Total Females. | Cured. | Relieved. | Advice, Desire, or no Change. | Irregular or Improper. | Died. | Average Residence in Hospital. Days. | Mortality per Cent. Males. | Fem. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OF THE EAR— | 13 | 10 | 2 | 2 | 6 | ... | ... | 3 | 1 | 1 | 1 | ... | ... | 19 | ... | ... |
| OF NOSE AND MOUTH— | | | | | | | | | | | | | | | | |
| Polypus Nasi, | 5 | 1 | 1 | ... | ... | ... | ... | 2 | 2 | ... | ... | ... | ... | 13 | | |
| Hare Lip, | 2 | 1 | 1 | ... | ... | ... | ... | 1 | 1 | ... | ... | ... | ... | | | |
| Epulis, Cancrum Oris, and kind not stated, | 22 | 13 | 8 | 1 | 1 | ... | 3 | 9 | 6 | 2 | 1 | ... | ... | | | |
| Total DISEASES OF NOSE AND MOUTH, | 28 | 15 | 10 | 1 | 1 | ... | 3 | 13 | 9 | 3 | 1 | ... | ... | ... | ... | ... |
| OF THE LOCOMOTIVE ORGANS— | | | | | | | | | | | | | | | | |
| Arthritis of Knee, | 1 | ... | ... | ... | ... | ... | ... | 1 | 1 | ... | ... | ... | ... | 54 | | |
| Of Upper Extremities, | 15 | 14 | 13 | ... | 1 | ... | ... | 1 | 1 | ... | ... | ... | ... | 42 | | |
| Of Lower Extremities, | 27 | 18 | 11 | 3 | 2 | ... | 2 | 9 | 8 | ... | ... | ... | 1 | 17 | | |
| Of Hip Joint, | 18 | 13 | 5 | 6 | 2 | ... | ... | 5 | 1 | 1 | 2 | ... | 1 | 55 | | |
| Of Bursæ, | 4 | 1 | 1 | ... | ... | ... | ... | 3 | 3 | ... | ... | ... | ... | 16 | | |
| Periostitis, | 15 | 7 | 3 | 3 | 1 | ... | ... | 8 | 7 | 1 | ... | ... | ... | 38 | | |
| Necrosis, | 24 | 15 | 8 | 4 | 2 | ... | ... | 9 | 5 | 3 | ... | ... | 1 | 47 | | |
| Caries, | 38 | 24 | 11 | 5 | 6 | ... | 2 | 14 | 6 | 4 | 4 | ... | ... | 62 | | |
| Of Joints, | 81 | 43 | 19 | 16 | 3 | ... | 5 | 38 | 29 | 6 | 1 | ... | 2 | 46 | | |
| Total DISEASES OF LOCOMOTIVE ORGANS, | 223 | 135 | 71 | 37 | 18 | ... | 9 | 88 | 61 | 15 | 7 | ... | 5 | ... | 7·37 | 6·82 |
| OF RECTUM AND ANUS— | | | | | | | | | | | | | | | | |
| Hæmorrhoids, | 13 | 12 | 10 | 2 | ... | ... | ... | 1 | 1 | ... | ... | ... | ... | 14 | | |
| Fistula in Ano, | 16 | 15 | 10 | 3 | 1 | .. | 1 | 1 | 1 | ... | ... | ... | ... | 34 | * | |
| Total DISEASES OF RECTUM AND ANUS, | 29 | 27 | 20 | 5 | 1 | ... | 1 | 2 | 2 | ... | ... | ... | ... | ... | ... | ... |
| TUMOURS— | | | | | | | | | | | | | | | | |
| Non-Malignant, | 18 | 7 | 4 | 2 | 1 | ... | ... | 11 | 8 | 2 | 1 | ... | ... | 18 | ... | ... |
| Malignant, | 36 | 18 | 11 | 1 | 6 | ... | ... | 18 | 8 | 2 | 6 | ... | 2 | 22 | ... | ... |
| Total TUMOURS, | 54 | 25 | 15 | 3 | 7 | ... | ... | 29 | 16 | 4 | 7 | ... | 2 | ... | ... | 6·89 |
| ABSCESSES— | 49 | 30 | 17 | 1 | 5 | ... | 7 | 19 | 15 | 3 | 1 | ... | ... | 28 | | |
| Ulcers of the Leg, | 98 | 48 | 36 | 8 | 2 | 2 | ... | 50 | 45 | 4 | ... | ... | 1 | 41 | | |
| ——— of other parts, | 47 | 22 | 13 | 3 | 4 | ... | 2 | 25 | 22 | 1 | 1 | 1 | ... | 24 | | |
| Varicose Ulcers, | 12 | 5 | 4 | .. | 1 | ... | ... | 7 | 7 | ... | ... | ... | ... | 12 | | |
| Total ABSCESSES, | 206 | 105 | 70 | 12 | 12 | 2 | 9 | 101 | 89 | 8 | 2 | 1 | 1 | ... | 8·56 | 6·99 |



TABLE I.—PATIENTS treated in the ROYAL INFIRMARY between the 1st of July 1843 and the 30th of September 1844, inclusive, arranged according to their DISEASES,—*Continued.*

| DISEASES. | Total Males and Females. | MALES. Total Males. | Cured. | Relieved. | Advice, Desire, or no Change. | Irregular or Improper. | Died. | FEMALES. Total Females. | Cured. | Relieved. | Advice, Desire, or no Change. | Irregular or Improper. | Died. | Average Residence in Hospital. Days. | Mortality per Cent. Males. | Fem. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GANGRENE OF FEET. | 2 | 2 | 1 | ... | ... | ... | 1 | ... | ... | ... | ... | ... | ... | 44 | 50 | ... |
| EXTERNAL INJURIES— | | | | | | | | | | | | | | | | |
| Fractures of Forearm, | 8 | 7 | 5 | ... | ... | ... | 2 | 1 | 1 | ... | ... | ... | ... | 34 | | |
| ——— of Bones of Hand, | 3 | 3 | 3 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 14 | | |
| ——— of Humerus, | 10 | 8 | 6 | ... | 2 | ... | ... | 2 | 2 | ... | ... | ... | ... | 22 | | |
| ——— Compound, | 1 | 1 | ... | ... | ... | ... | 1 | ... | ... | ... | ... | ... | ... | 1 | | |
| ——— of Bones of Face, | 1 | 1 | 1 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 31 | | |
| ——— of Cranium, | 2 | 2 | ... | ... | ... | ... | 2 | ... | ... | ... | ... | ... | ... | 4 | | |
| ——— of Spine, | 2 | 2 | ... | ... | ... | ... | 2 | ... | ... | ... | ... | ... | ... | 23 | | |
| ——— of Scapula, | 2 | ... | ... | ... | ... | ... | ... | 2 | 2 | ... | ... | ... | ... | 43 | | |
| ——— of Ribs, | 8 | 6 | 6 | ... | ... | ... | ... | 2 | 2 | ... | ... | ... | ... | 20 | | |
| ——— of Clavicle, | 3 | 2 | 2 | ... | ... | ... | ... | 1 | 1 | ... | ... | ... | ... | 23 | | |
| ——— of Thigh, | 12 | 11 | 11 | ... | ... | ... | ... | 1 | ... | ... | ... | ... | 1 | 54 | | |
| ——— Compound, | 3 | 3 | 2 | ... | ... | ... | 1 | ... | ... | ... | ... | ... | ... | 112 | | |
| ——— of Pelvis, | 2 | 2 | 1 | 1 | ... | ... | ... | ... | ... | ... | ... | ... | ... | 26 | | |
| ——— of Bones of the Leg, | 42 | 36 | 27 | ... | ... | ... | 3 | 12 | 11 | ... | ... | ... | 1 | 34 | | |
| ——— Compound, | 14 | 11 | 4 | ... | ... | ... | 7 | 3 | ... | ... | ... | ... | 3 | 23 | | |
| Comminuted Fracture of Patella, | 1 | ... | ... | ... | ... | ... | ... | 1 | 1 | ... | ... | ... | ... | 59 | | |
| ——— of the Bones of the Foot, | 2 | 2 | 1 | ... | ... | ... | 1 | ... | ... | ... | ... | ... | ... | 49 | | |
| Dislocation of Shoulder and Scapula, | 3 | 3 | 2 | ... | 1 | ... | ... | ... | ... | ... | ... | ... | ... | 14 | | |
| Injuries of the Head, | 19 | 15 | 10 | 2 | ... | ... | 3 | 4 | 3 | ... | ... | ... | 1 | 11 | | |
| ——— of the Face, | 2 | 1 | 1 | ... | ... | ... | ... | 1 | 1 | ... | ... | ... | ... | 5 | | |
| ——— of Hand, | 4 | 2 | 2 | ... | ... | ... | ... | 2 | 2 | ... | ... | ... | ... | 19 | | |
| ——— of the Chest, | 1 | 1 | 1 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 6 | | |
| ——— of the Back, &c., | 22 | 16 | 12 | 2 | 2 | ... | ... | 6 | 5 | ... | ... | ... | 1 | 24 | | |
| Incised Wounds, | 6 | 5 | 5 | ... | ... | ... | ... | 1 | 1 | ... | ... | ... | ... | 8 | | |
| Lacerated and Contused Wounds, | 4 | 3 | 3 | ... | ... | ... | ... | 1 | 1 | ... | ... | ... | ... | 51 | | |
| Gunshot Wounds, | 2 | 2 | 1 | ... | ... | ... | 1 | ... | ... | ... | ... | ... | ... | ... | | |
| Wounds of Scalp, | 24 | 14 | 14 | ... | ... | ... | ... | 10 | 9 | 1 | ... | ... | ... | 17 | | |
| Burns and Scalds, | 40 | 11 | 9 | ... | 1 | ... | 1 | 29 | 23 | 1 | ... | ... | 5 | 52 | | |
| Cut Throat, | 5 | 5 | 4 | ... | ... | ... | 1 | ... | ... | ... | ... | ... | ... | 26 | | |
| Total EXTERNAL INJURIES, | 253 | 169 | 133 | 5 | 6 | ... | 25 | 86 | 70 | 4 | ... | ... | 12 | ... | 14·79 | 13·95 |
| TALIPES—and Contraction of Spine, | 12 | 5 | 4 | ... | 1 | ... | ... | 7 | 7 | ... | ... | ... | ... | 11 | | |
| Curvature of Spine, | 1 | ... | ... | ... | ... | ... | ... | 1 | 1 | ... | ... | ... | ... | 45 | | |

## TABLE II.

GENERAL ABSTRACT OF THE PRECEDING TABLE.

| DISEASES. | Total Males and Females. | MALES. | | | | | | FEMALES. | | | | | | Mortality per Cent. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Total Males. | Cured. | Relieved. | Address, Desire, &c. Cases. | Irregular or Improper. | Died. | Total Females. | Cured. | Relieved. | Address, Desire, &c. Cases. | Irregular or Improper. | Died. | Males. | Fem. |
| Fevers, | 4645 | 2286 | 2082 | 2 | 8 | 5 | 189 | 2359 | 2174 | 2 | 8 | 3 | 172 | 8·27 | 7·29 |
| Of the Nervous System, | 216 | 111 | 41 | 31 | 12 | 2 | 25 | 105 | 40 | 32 | 12 | 1 | 20 | 22·52 | 19·04 |
| Of Respiratory Organs, | 372 | 216 | 72 | 59 | 24 | 3 | 57 | 156 | 70 | 38 | 10 | ... | 38 | 26·45 | 24·35 |
| Of Organs of Circulation, | 103 | 68 | 6 | 23 | 10 | ... | 29 | 35 | 3 | 11 | 4 | .. | 17 | 42·64 | 48·57 |
| Of Organs of Digestion, | 238 | 117 | 60 | 25 | 5 | 1 | 21 | 121 | 69 | 25 | 11 | ... | 23 | 18·75 | 18·25 |
| Of Genito-Urinary Organs, | 258 | 179 | 106 | 36 | 17 | 4 | 14 | 79 | 29 | 20 | 13 | 5 | 12 | 7·82 | 15·18 |
| Miscellaneous, | 264 | 145 | 89 | 34 | 8 | 3 | 11 | 119 | 86 | 20 | 3 | 5 | 5 | 7·58 | 4·20 |
| Of Integumentary Syst. | 153 | 84 | 61 | 13 | 6 | 1 | 3 | 69 | 57 | 9 | 2 | ... | 1 | ... | ... |
| Of the Eye, | 64 | 41 | 18 | 12 | 10 | 1 | ... | 23 | 17 | 3 | 3 | ... | ... | ... | ... |
| Of the Ear, | 13 | 10 | 2 | 2 | 6 | ... | ... | 3 | 1 | 1 | 1 | ... | ... | ... | ... |
| Of Nose and Mouth, | 28 | 11 | 10 | 1 | 1 | ... | 3 | 13 | 9 | 3 | 1 | ... | ... | ... | ... |
| Of Locomotive Organs, | 223 | 135 | 71 | 37 | 18 | ... | 9 | 88 | 61 | 15 | 7 | ... | 5 | 7·37 | 6·69 |
| Of Rectum and Anus, | 29 | 27 | 20 | 5 | 1 | ... | 1 | 2 | 2 | ... | ... | ... | ... | ... | ... |
| Tumours, | 54 | 28 | 15 | 3 | 7 | ... | ... | 26 | 16 | 4 | 7 | ... | 2 | 0·00 | 6·98 |
| Abscesses, Ulcers, &c. | 296 | 195 | 76 | 12 | 12 | 2 | 9 | 101 | 89 | 8 | 2 | 1 | 1 | 9·56 | 0·99 |
| Gangrene of Feet, | 2 | 2 | 1 | ... | ... | ... | 1 | ... | ... | ... | ... | ... | ... | 50·00 | ... |
| External Injuries, | 255 | 169 | 135 | 5 | 6 | ... | 25 | 86 | 70 | 4 | ... | ... | 12 | 14·79 | 13·95 |
| Talipes and Contraction of Tendons, | 12 | 5 | 4 | ... | 1 | ... | ... | 7 | 7 | ... | ... | ... | ... | ... | ... |
| Curvature of Spine, | 1 | ... | ... | ... | ... | ... | ... | 1 | 1 | ... | ... | ... | ... | ... | ... |
| | 7136 | 3753 | 2861 | 302 | 152 | 22 | 397 | 3401 | 2901 | 193 | 84 | 15 | 308 | ... | ... |
| Cases of Pregnancy, No Disease, Dead, or out in a few hours, and disease not reported, | 68 | | | | | | | | | | | | | | |
| Total. | 7204 | | | | | | | | | | | | | | |

## TABLE III.

TABLE OF ADMISSIONS OF FEVER PATIENTS DURING EACH MONTH.

| MONTHS. | Total. | Males. | Fem. | DIED. | | Mortality per Cent. | | Average Mortality. |
|---|---|---|---|---|---|---|---|---|
| | | | | Males. | Fem. | Males. | Fem. | |
| July 1843. | 263 | 133 | 130 | 14 | 7 | | | |
| August „ | 462 | 266 | 262 | 9 | 10 | | | |
| September „ | 601 | 297 | 304 | 14 | 16 | | | |
| October „ | 655 | 320 | 335 | 23 | 30 | | | |
| November „ | 573 | 280 | 293 | 24 | 16 | | | |
| December „ | 530 | 265 | 265 | 18 | 14 | | | |
| January 1844. | 470 | 207 | 239 | 27 | 11 | | | |
| February „ | 308 | 155 | 153 | 15 | 8 | | | |
| March „ | 271 | 145 | 126 | 10 | 17 | | | |
| April „ | 137 | 77 | 60 | 5 | 4 | | | |
| May „ | 109 | 55 | 54 | 4 | 7 | | | |
| June „ | 74 | 32 | 42 | 8 | 11 | | | |
| July „ | 78 | 36 | 42 | 7 | 8 | | | |
| August „ | 73 | 33 | 40 | 3 | 7 | | | |
| September „ | 41 | 21 | 20 | 8 | 7 | | | |
| Total. | 4645 | 2286 | 2359 | 189 | 172 | 8·27 | 7·29 | 1 Death in 13 Cases nearly. |

# THE GANNAL PROCESS;

BY WHICH

## The Progress of Decay is Arrested;

THE CAUSES OF

## CONTAGION OR INFECTION PREVENTED;

AND THE NECESSITY OF

## EMBALMING SUPERSEDED.

---

4, *John Street, Oxford Street.*

*July* 1, 1840.

In no country, it is believed, is more decent and rational respect paid to the observance of every ceremony which concerns the Remains of a Deceased Relative or Friend, than in England; seeing that, in no country, the feeling of tender regard to the memory of the Departed is more affectionately cherished: and, if this has hitherto been the characteristic of Englishmen, it will be acknowledged that it is especially so at the present moment; when, in consequence of the increased population of the country, and the consequent crowded condition of the receptacles till now appropriated to the dead, Cemeteries are in progress of erection, not only in the environs of this great metropolis,

but of most of the large cities and towns of the United Kingdom.

At such a moment, and under such circumstances, it can be little doubted, that a determination, on the part of the Proprietor, to introduce into this country, with regard to Interments, the recently discovered Process, by means of which the remains of the Deceased can be preserved for a considerable length of time, without material change in appearance and without inconvenience or danger to the living, will meet with the same favourable reception in England, which has attended its establishment in France.

The Proprietor has been encouraged to take this step, from having witnessed, in numerous instances, the extreme distress occasioned to relations and friends, by the early appearances of decay; and from his conviction, that such distress will be greatly alleviated, by means of the said Discovery. He conceives, also, that where the place of sepulture may be situated at a distance, or where the members of a family may happen to be absent, it must be a source of great satisfaction to know, that a Process is ready for application, on the instant and at a moderate expense, which will preserve the body for an unlimited period from incipient decay, without alteration in its appearance or the presence of the slightest effluvia—which arrests putrescency and the liability to cause contagion—which occupies but a short space of time in the performance, and is unattended with any distressing exposure or disfigurement of the person—which may, when desirable, be performed in the presence of the nearest friends of the deceased, without giving pain to minds of the most delicate sensibility—and by the application of which, the usual, but very revolting mode of preserving the remains of the dead, by Embalming, will be superseded.



Among the numerous discoveries made, of late years, in the science of chemistry, none has, probably, been more favourably received on the Continent, than The Gannal Process;—so designated in France, from the name of the eminent chemist and natural philosopher, by whom it was first discovered in the year 1826; and who, after fourteen years' unwearied skill and labour, has at length succeeded in bringing it to its present state of perfection. The attention of the Proprietor was first directed to the subject in the year 1838, shortly after his being appointed the Correspondent for England of the "Entreprise Générale des Inhumations," established in Paris, by Royal Ordinance, for the conducting of Funerals, both public and private; and, so strongly impressed was he with a conviction of the many useful purposes, connected with Science and the Public Health, to which it might be rendered applicable, that he was induced to visit M. Gannal at Paris, and thereby become an eye-witness of his various experiments: and the results of his personal observations were so highly satisfactory, that he lost no time in entering into an agreement with M. Gannal, by which that gentleman reserved to himself the patent presented to him by the French Government, and the Proprietor became the sole patentee of the Discovery for England—M. Gannal engaging to visit London, for the purpose of superintending those Arrangements which are now announced as being completed.

To the preceding statement, the Proprietor begs leave

to subjoin a brief notice of the origin and progress of the Discovery in France—the rigid investigation it has undergone — the opinions of the Royal Academy of Sciences, and of the Royal Academy of Medicine of Paris, as to its decided superiority over every method hitherto known—the national rewards which have been bestowed upon the Discoverer — and the extraordinary rapidity with which it has established itself in the public favour.

In 1835, the Academy of Sciences of Paris, at the express desire of M. Gannal, appointed a Commission, to inquire into, and report to them upon, the merits of his Discovery. The Commission lost no time in entering upon their labours, and, on the 28th of December in that year, reported to the Academy, that, after a careful investigation of the matters referred to them, they felt themselves justified in bearing testimony to the extraordinary preservative qualities of the Process. They added, that they considered it capable of being rendered highly useful to various purposes of science; and, considering the obstacles he had encountered and the difficulties he had overcome, they recommended that a sum should be awarded to M. Gannal, to encourage him to proceed with his experiments.

In the same year, in consequence of a letter addressed by the Minister of Commerce and Public Works to the Academy of Medicine, that learned body appointed a Commission, consisting of five of its most distinguished members; namely, Messieurs Sanson, Roux, Dizé, Guéneau de Mussy, and Breschet, to institute a similar inquiry. The result was, an elaborate report, drawn up by M. Breschet; in which the Commission stated, that they considered it their



duty to direct the attention of the Academy and of the Government, to the great value of the Discovery; and they expressed a hope, that an advance of the public money would be made to the Discoverer, to enable him to bring it to perfection.

In 1837, the same Commission made their second and definitive Report; in which they state that, during the preceding two years, M. Gannal had been incessantly occupied upon a series of experiments, with a view to ascertain the best mode of preserving Animal Substances, and that he had at length succeeded in discovering a fluid, by the antiseptic properties of which, the remains of deceased persons might, by the simple and delicate process of injection by one of the arteries, be preserved, for a considerable length of time, without any material change of feature or discoloration of countenance. After detailing a variety of experiments, of which they had been eye-witnesses, and all of which had been attended with complete success, they gave it as their unanimous opinion, that M. Gannal had rendered an important service to Science and Humanity; and they further recommended, that their Report should be forwarded to the Minister of Public Instruction, directing his attention to a Discovery capable of being applied to so many useful purposes; and likewise to the Minister for Commerce and Public Works, as a means whereby the Public Health might be placed on a surer foundation.

Both Commissions dwell upon the great utility of the Process, in preserving subjects for scientific purposes, in sultry seasons or in hot climates;—in preventing the danger

arising to professional men, from accidental wounds or punctures made in their own hands, in the course of practice; and in enabling deceased persons to be kept, for any length of time, in all cases where the causes of death may have been of a doubtful nature.

To the above striking facts, it will only be necessary to add a passage or two from the Report of the Commission of the Members of the Royal Institute, on awarding to M. Gannal the great prize, founded by the celebrated Baron Montyon, for the discovery of the best means of rendering any art or profession less insalubrious. The Commission state it to be their conviction, that the Process is at once simple, easy of execution, and economical; and that the materials employed are of a perfectly innocuous description. Still further to confirm that conviction, they obtained the opinions of many of the most eminent anatomical professors throughout France; and, among others, those of their colleague, M. Serres, and of M. Dubreuil, Dean of the Faculty of Medicine of Montpellier, M. Bourgery, M. Auzoux, M. Velpeau, and M. Amussat; who were unanimously of opinion, that M. Gannal, by his Discovery, had put the world in possession of a Process which might not only be made available to scientific purposes, but be rendered highly conducive to the General Health of the Community.

In consequence of the above powerful testimonials, the Process has been introduced into the great Anatomical Schools in Paris:—in nearly all the recent Interments of distinguished individuals the old and revolting mode of embalming has been superseded by the



new and simple method:—and the Government of France, in cases of Suspicious Death, where the preservation of the body is likely to lead to the furtherance of the ends of public justice, have resorted to the Process; and with such success, that, in a recent instance of the murder of a youth at La Villette, the body, by being exposed, in a state of perfect preservation, at the receptacle of La Morgue, in Paris, for more than two months, led to the discovery of the murderer.

GEORGE SMITH.

*4, John Street, Oxford Street.*
*July* 1, 1840.

Printed by J. L. Cox and Sons, 75, Great Queen Street,
Lincoln's-Inn Fields.

# AN ACCOUNT

OF

# LORD BACON'S

# NOVUM ORGANON SCIENTIARUM;

OR,

## NEW METHOD OF STUDYING THE SCIENCES.

---

*THE FIRST, OR INTRODUCTORY PART.*

Sir Francis Bacon, Lord Verulam, is justly held the *founder* of *Experimental Philosophy*. He proposed his plan in his *Instauratio Magna*, with so much strength of argument, and so just a zeal, as renders that admirable work the delight of all who have a taste for solid learning.—MACLAURIN's *Account of* NEWTON's *Philosophical Discoveries*.

# ACCOUNT

OF THE

# NOVUM ORGANON.

HOMO, NATURÆ MINISTER ET INTERPRES, TANTUM FACIT ET INTELLIGIT QUANTUM DE NATURÆ ORDINE RE VEL MENTE OBSERVAVERIT; NEC AMPLIUS SCIT, AUT POTEST.—*Nov. Org.*

LORD BACON was the first who taught the proper method of studying the sciences: that is, he pointed out the way in which we should begin and carry on our pursuit of knowledge, in order to arrive at *truth*. He gave a set of rules by which mankind might deliver themselves from slavery to names, and from wandering among fanciful systems, and return once more, as little children, to the school of nature. The task he chose was far more useful to the world, and honourable to himself, than that of being, like Plato or Aristotle, the author of a new sect: he undertook to expose the errors of those who had gone before him, and to shew the best way of avoiding them for the future: he had the principal share in pulling down the old building of a false philosophy, and, with the skill of a superior architect, he laid the foundation, and sketched the plan of another fabric; and gave masterly directions to those who should come after him—how, upon the ruins of the first, the temple of science must be erected anew. As, in a great army, there are some whose office it is to construct bridges, to cut paths along mountains, and to remove various impediments, so Lord Bacon may be said to have cleared the way to knowledge; to have marked out the road to truth; and to have left future travellers little else to do than follow his instructions: he was the miner and sapper of philosophy, the pioneer of nature; and he eminently promoted the dominion of man over the material world. He was the priest of nature's mysteries; and he taught men in what manner they might discover her profoundest secrets, and interpret those laws which nature has received from the great Author of all.

It is the object of this Treatise to make our readers acquainted with Lord Bacon's Philosophy, as it is contained in his great work, the *Novum Organum*; in which we find the principles of that improved

method of conducting the inquiries of science, which has now so long and so happily prevailed. To accomplish this design with the more effect, it will be desirable, first, to draw their attention, in a few words, to the state in which Bacon found the world, as to knowledge and science, at the time when he flourished. For, as the returning light appears more glorious after the sun has been eclipsed—and the order and beauty of nature would look doubly striking to an eye that had seen that chaos from which she first arose, when all was without form and void,—so, if we glance, but for a moment, at that darkness which so long overshadowed the human mind, and gave birth to so many phantoms and prodigies, under the name of science, this retrospect will serve to show more clearly the merits of a philosopher, who may be regarded as the morning star of that illustrious day which has since broken out upon mankind; and in the spirit of whose method, even the immortal NEWTON himself explored the heavens—by the aid of a sublime geometry, as with the rod of an enchanter, dashed in pieces all the *cycles, epicycles*, and *crystal orbs* of a visionary antiquity; and established the true Copernican doctrine of astronomy on the solid basis of a most rigid and infallible demonstration.

In several of the fine arts, in which chiefly the taste and imagination are concerned, such as poetry, rhetoric, statuary, and architecture, the ancients, according to general opinion, have equalled, if not surpassed, any of the moderns. Homer and Demosthenes continue, notwithstanding the flux of time, to retain their station as the masters of eloquence and song; and those exquisite statues, the Venus and the Apollo, still command our admiration as perfect models of what is chaste, and severe, and beautiful in the art of sculpture. The ancients nobly distinguished themselves also in those more rigorous exercises of the understanding which are demanded by pure mathematics; in proof of which it is sufficient to quote the name of Euclid, and of Archimedes whose discoveries in geometry and mixed science entitle him to be regarded as the *Newton* of all antiquity; but it was reserved for the moderns to invent a *calculus*—a new and more profound arithmetic, which was called for by a more exact acquaintance with nature herself, and was to be applied to that more improved state of natural science which is peculiar to later times: we allude to the doctrine of *fluxions*, or the *differential* method of Newton and Leibnitz; since cultivated, and applied to physical astronomy with great success by the French, and especially by LA PLACE. In most of those branches of knowledge, however, which rest on the basis of *experiment* and *observation*, the ancients almost entirely failed. The case is, that to form *theories*, or systems of science and philosophy, from a hasty view of facts and appearances, is an easy task, since this can be done without the labour of close and patient thinking: and if antiquity be, in truth, as Bacon himself represents it, but the childhood and youth of the world, it is nothing more than we might expect that, at that period of its existence, imagination should prevail over reason; and that the calmer and more successful exercises of the latter should not unfold themselves till a maturer age.

One instance, out of many, in natural science, may suffice to convince the reader to what absurd and extravagant notions the



mind can reconcile itself, when once permitted to rove into the regions of imagination, unrestrained by that strict and scientific method, so successfully pointed out by Lord Bacon, and which it is our present object to explain. *Cosmas Indopleustes*, who lived so late as the *sixth century*, affirmed that the earth was an oblong plane, surrounded by an impassable ocean; an immense mountain in the form of a cone, or sugar-loaf, placed in the north, was the centre around which the sun, moon, and stars daily revolved: the shape of this mountain, and the slanting motion of the sun, accounted for the variable length of the days, and the changes of the seasons. The heavens were supposed to be an immense arch, one side of which rested on the earth, and the other on two mighty pillars beyond the sea; under this vault a multitude of angelic beings were employed in guiding the motions of the stars. Such was the theory which gravely presented itself for adoption, seven or eight centuries later in the world than Euclid, Archimedes, and Apollonius!

Abundant instances of almost equal absurdity might be collected from the opinions of the ancients, on various other branches of science. Take, for example, the doctrine of *sensation*, or feeling, in what was called the *Peripatetic* school, so called from a word signifying to *walk about*, because it was customary for the disciples to study and dispute as they walked in the *Lyceum*, a place at Athens which was appropriated to their use. Of this school, the founder was ARISTOTLE, a man of immense genius, who obtained the greatest popularity, and the most extensive influence over the opinions of mankind, of all the philosophers of antiquity, and who held the minds of men in a kind of intellectual bondage for about two thousand years. In the Peripatetic philosophy, what takes place in *sensation* was thus described: a sort of images, or, as they were termed, *sensible species*, that is, certain films of the shape of bodies, came off, it was said, from the objects of sense, and arriving at the organs which were proper to them, were admitted to the nerves, and by them conveyed to the brain: here these images were impressed, as the engraving of a seal on wax, and being now refined into what were called *intellectual species*, the whole business of sensation and perception was supposed to be accounted for. Thus by a jargon of words men were taught to believe they understood the manner in which *matter* communicates with *mind* or *spirit*, and their operation upon each other, which, all that has ever been said or written on the subject, shows to be inexplicable, and to be received simply as a *fact* in the constitution of sentient being.

Up to the time of Lord Bacon, Aristotle still maintained, in a very great degree, his dominion in the realms of philosophy—a dominion which, at some periods, had been scarcely less absolute over the minds of men, and far wider and more lasting than ever his renowned pupil Alexander was able to secure over their bodies. Possessed of a most acute and penetrating mind, and a singular talent for minute investigations, he was qualified, in this respect, for philosophical inquiries far more than ordinary men. His writings in natural history in particular, constitute a mass of physical and anatomical facts, which must have resulted from a course of very diligent observations. Neglecting, however, that rigid and exact practical method which is essential

to all natural science, too much devoted to subtil distinctions of words; and too ambitious of gaining an ascendancy over the opinions of mankind, he pronounced too boldly on nature's operations, and spent his energies too often in useless or obscure questions. In his desire to set up his own dogmas, in opposition to ancient opinions, he is sometimes guilty of misrepresenting the philosophers of a remoter antiquity; and he frequently veils himself in an obscure and unintelligible jargon. Lord Bacon describes his propensity to tyrannize over men's minds, by saying that, "as though he had been of the race of the Ottomans, he thought he could not reign securely unless all his brethren were slain." Cicero, who seems to have had some respect for Aristotle's philosophy, acknowledges that, in his time, it was understood by very few even of the philosophers themselves. His *Logic*, which is peculiarly his own, is undoubtedly a great effort of human ingenuity; it consists in an *analysis* of that process of the mind which, however rapid, and almost imperceptible, must take place in all sound and correct reasoning. It furnishes the model to which all such reasoning may be reduced, and serves as a test by which the justice of an argument may be tried, if it be ever necessary thus minutely to put down all the steps by which the conclusion is arrived at. In the discoveries of science it can of course afford little or no assistance, and it was the mistaken attempt to employ it for this purpose, that so long excluded the proper method of entering on philosophical researches, and filled the minds of men with mere words, and confused notions. Bacon's observations on this subject in his *Advancement of Learning*, show that his frequent condemnations of the logical philosophers were levelled against the extravagant perversions of Aristotle's *Dialectics*, with which these schoolmen were chargeable, and to which Aristotle himself had led the way. His logic was the engine by which, for ages, the minds of men were bewitched in a manner that was altogether extraordinary, and diverted from things themselves to mere words.

The philosophy of Aristotle, which it would be foreign to the purpose of this treatise more than to characterize generally, without entering into its details, obtained the same credit at Rome, under the Cæsars, which it had already acquired in Greece; being patronized by both Julius and Augustus. Towards the close of the fifth century, the influence of Aristotle began to prevail over that of Plato in the Christian world. After considerably declining during the sixth century, it again revived; and in another century it had gained such an ascendancy that Aristotle seems to have been every where triumphant. Glosses, paraphrases, summaries, arguments, and dissertations on his works were composed without end; as if to make "darkness visible." Many of the inhabitants of the west learned Arabic in order to read a translation of them in that language. The Latin tongue was made another medium of their circulation, and they were read in most parts of the known world. Men were every where taught to believe in *matter*, *form*, and *privation*, as the origin of all things; that the heavens were self-existent, incorruptible, and unchangeable; and that all the stars were whirled round the earth in solid orbs! Aristotle's works were the great text-book of knowledge, and his logic was the only weapon of



truth. Men's minds, instead of simply studying nature, were in an endless ferment about occult qualities and imaginary essences; little was talked of but *intention* and *remission*, *proportion* and *degree*, *infinity*, *formality*, *quiddity*, *individuality*, and innumerable other abstract notions. The Latin tongue, which was employed by these scholastics, was converted into a barbarous jargon, which a Roman would not have understood; and, in the end, the most sectarian bitterness was produced, sometimes ending in bloody contests. In the midst of these disputes, Aristotle was still the grand authority. Christians, Jews, and Mahometans, united in professing assent to the great lawgiver of human opinions: not Europe alone, but also Africa and Asia acknowledged his dominion; and while his Greek originals were studied at Paris, translations were read in Persia and at Samarcand.

The rage for disputation which now began to prevail in consequence of the spread of this philosophy, induced the council of Lateran, under Pope Innocent III., to proclaim a prohibition of the use of the physics and metaphysics of Aristotle; but awful as were then the thunders of the Vatican, they were not mighty enough to dethrone him from that despotism over men's minds, which, by long custom, had now rendered itself almost omnipotent. The passion for the Aristotelian subtilties had become so general, that, notwithstanding Pope Innocent's decree, it was soon found necessary to favour publicly, in some degree, at least, the study of their author; and accordingly, his Dialectics, Physics, and Metaphysics were received into the University of Paris by an express statute to that effect. In England his doctrines were cherished with as great an eagerness as elsewhere. From about the end of the twelfth century the very name of Aristotle operated like a charm; his writings had obtained universal circulation, and in some of the universities of Europe statutes were framed which required the professors to promise, on oath, that in their public lectures on philosophy they would follow no other guide!

From this period till the close of the sixteenth century, though the authority of Aristotle still continued in the schools, the minds of men were gradually preparing to shake off his yoke, and a more propitious era was fast approaching. The revival of learning in the fifteenth century, the invention of the art of printing, and the Reformation, had done much to prepare the world for that new light which was afterwards to be cast over the fields of science, hitherto covered with darkness, and peopled only with airy and delusive phantoms. A few distinguished men—as *John of Salisbury*, *Gros-tête*, Bishop of Lincoln, *Roger Bacon*, *Ludovicus Vives*, and others, had taught mankind that neither the decrees of the Vatican, nor those of the Grecian schools, were incapable of being resisted. *Gilbert* had successfully investigated the laws of magnetic attraction, and furnished an excellent specimen of reasoning from experiment. In opposition to the system that was held by Aristotle and his followers, which made the earth the centre of the universe, *Copernicus* had revived the ancient Pythagorean doctrine of the earth's motion round the sun, and had discovered the true theory of the planets. *Galileo*, *Kepler*, *Gassendi*, and others who lived at the same time with Bacon, were acquiring a well-earned fame by their improvements in geometry and physics; and the whole world of science

already sighed to be redeemed from the darkness of the middle ages, and the bondage of the schools. *Martin Luther*, who had been taught the philosophy of Aristotle in his youth, had expressed his contempt for its vanities, and rejected it with indignation. *Ramus*, also, had attacked the existing opinions at Paris, and disputed publicly against Aristotle's doctrines in the university of that city. Like many other honest followers of truth, however, in this wretched world, which has always loved darkness rather than light, he suffered severely for his boldness. As a punishment for his presuming to question the infallibility of the great despot of all knowledge, in an edict of the French parliament, under Francis I., the said Peter Ramus is gravely pronounced to be "insolent, impudent, and a liar;" his books are, now, and for all time coming, condemned, suppressed, and abolished, and the author is solemnly prohibited from copying, or even reading, his own works. *Bruno*, *Campanella*, *Patricius*, *Nizolius*, and some others, also contributed their part to undermine the influence of Aristotle.

It was reserved, however, for Francis Bacon, Lord Verulam, to break the spell of the mighty enchanter of Stagira, and to give a final blow to the scholastic philosophy;—to make one grand and general attempt to deliver men's minds from the bondage of two thousand years;—to assert the right of that reason with which the beneficent Creator has endowed man, as above all authority merely human;—and to sketch the outline of one grand and comprehensive plan, that should include in it the endless varieties of our knowledge, and guide our inquiries in every branch. Born in the year 1561, and early entered as a student at Trinity College, Cambridge, this great genius soon began to feel dissatisfied with the vagueness and uncertainty of the existing state of knowledge, the want of connexion between the sciences and the arts, and the consequent uselessness of the reigning speculations as regarded the purposes of life. The more he thought on the subject, the more he was convinced of the vanity of the scholastic learning of the times, and of the necessity of a thorough reformation in the method of treating the knowledge of nature, by laying aside all conclusions not founded on observation and experiment. He saw plainly that a great part of the evil lay in the extensive influence which Aristotle still possessed in the schools; that *nature* and *fact* were neglected for the study of his doctrines, which were the arbiters in all disputes; the properties of matter, and the laws of motion, by which all effects are produced, were lost in useless distinctions and dry definitions; the powers of the mind were exhausted in grave trifling and solemn folly; and the real advancement of human knowledge was altogether hopeless, so long as such a state of things prevailed. A century or two earlier, the contests about *names*, and *forms*, and *essences*, were sometimes more serious than a mere strife of tongues: they ended in actual bloodshed; while the disputants took the side either of *Occam*, "*the most subtil*," or *Duns Scotus*, "*the invincible*," the famous champions of the day; and if the din of this philosophical, or rather *un*philosophical war now raged no longer,—if those imposing titles were not now heard which had formerly been bestowed on the leaders of rival parties, such as the *most profound*, the *marvellous*, the *perspicuous*, the *irrefragable*, the *most resolute*, the *angelical*, the *seraphic doctor*,—it was that all inquiry had well nigh



ceased, and the minds of men were cast, with a very few exceptions, into a profound slumber, and filled only with the romantic visions of an imaginary philosophy.—Such had been the state of things at the time of Lord Bacon, and the brief notice we have taken of it may serve to throw light on the real value of his labours, which had for their object the establishment of a philosophy that is in fact no other than the philosophy of reason and common sense, in opposition to all mere theory and fancy, and to all imposition.

Under these circumstances Bacon wrote his Organon. His qualifications for this bold attempt to clear the barren wastes of science, and to sow the seeds of a new creation of useful knowledge, will be best seen by studying his doctrines. We shall, therefore, now proceed to give an account of this most important and considerable part of his general work, the *Instauratio Magna*, or *Instauration of the Sciences*. Its title was probably suggested by Aristotle's *Organon*, containing his Logic; it is called *Novum Organon Scientiarum*, or *a new Method of Studying the Sciences*, from the Greek word *organon*, which signifies an *instrument* or *machine*. The grand principle which characterizes this great work, and by the proper use of which its author proposes the advancement of all kinds of knowledge, is the principle of *Induction*, which means, literally, *a bringing in*; for the plan it unfolds is that of investigating nature, and inquiring after truth, not by reasoning upon mere conjectures about nature's laws and properties, as philosophers had been too much accustomed to do before, but by *bringing together*, carefully, and patiently, a variety of particular facts and instances; viewing these in all possible lights; and drawing, from a comparison of the whole, some general principle or truth that applies to all. The foundation of this philosophy lies, in short, in the *history of nature itself*—in making a laborious collection of the facts relating to any one subject of inquiry, previously to any attempt at forming a system or theory. Actual experiment, which Bacon significantly terms "asking questions of nature," must be resorted to, where experiments, as in chemistry, can be made: observations must be accurately collected, in the subjects proper to these, as astronomy; and conclusions are, in all cases, to be drawn only from what is actually witnessed, after the comparison of a sufficient number of facts, and a due regard to objections. In his treatment of this important subject of Induction, a new and more rational employment of the faculties is exhibited than the world had ever seen; and never before was there laid down to the minds of men the true theory of investigating all truth, whether natural or moral: indeed, Bacon has well merited the appellations he has received—the *Prophet of the Arts*, and the *Father of Experimental Philosophy*.

To point out the amazing success which has attended this system, which may be called the *Baconian* method, in the hands of the moderns, were an endless task—it would be, to give nothing less than the history of science for the last two hundred years. The constellation of geniuses that rose in the next age mostly looked up to Bacon as their leading star. Newton himself was able to outshine them all, not merely by the energy of his own mind, but by his imbibing most deeply the spirit of this philosophy. No feature of Newton's intellect was more remarkable than the singular command he possessed over his

imagination, by which he was enabled to construct theories, more surprising than all the visions of fancy, yet on a foundation that must remain unshaken so long as the human mind and truth continue what they are. We may name his *Optics*, in passing, as a triumphant example of the *Inductive* method, in which, by experiment and observation as the basis of his calculations, he has treated of the nature and properties of *light*, one of the most subtil of all things, in a manner that cannot fail to surprise and delight the reader: with so much accuracy and precision is this wonderful element reduced to certain laws, as truly as the most gross and solid bodies. Having found, by very accurate experiments, that light always proceeds in straight lines, and that the rays of it are reflected and refracted according to certain fixed and unchanging laws,—on this experience he establishes the whole theory of *optics*, or the science of *vision*; and thus this science is founded on the *induction* we speak of.

Again—the mere falling of a heavy body to the earth was found by Newton to involve principles which apply to all we know in mechanical philosophy; in other words, the descent of a tile from a house, or an apple from a tree, arises from the same cause which keeps the moon from leaving her proper course round the earth; and which retains all the planets in their paths round the sun: this principle, or cause, is called by the name of *gravity*. It was known from observation that gravity, or a tendency to approach the earth, belongs generally, to all bodies near its surface; and it was ascertained that it is proportioned to the square of the distance; that is, if a body be attracted by the earth at a certain distance, with a certain force, and be afterwards removed to *twice* the distance, it will now be attracted *not half* as much, but only *one-fourth* as much as it was before; and if it be removed to *three* times the first distance, it will be attracted not *one-third* as much, but only *one-ninth* as much as before, 4 being the square of 2, and 9 the square of 3. From these facts this mighty genius suspected that the same principle might extend to all nature; and thus, by the assistance of a profound geometry, he explained the motions of the heavenly bodies, and demonstrated the system of the world.

That the rules laid down by Bacon had been carefully studied by Newton, is evident from the use he makes of Bacon's phraseology. In his *Principia*, for instance, he gives the same latitude of meaning to the word *axiom* that Bacon does in his *Organon*. Bacon, by this term, means a general principle, obtained by experiment and observation, from which we may safely proceed to reason in all other instances; and Newton gives the name of *axioms* to the *laws of motion*, which of course are ascertained by the scrutiny of nature; he also terms *axioms* those general experimental truths, or *facts*, which form the groundwork of the science of optics. *Axiom*, however, in the language of Euclid, and of mathematicians generally, means a self-evident proposition. Mr. Dugald Stewart thinks that, in this, and other instances, Newton followed Lord Bacon's phraseology "too implicitly." However this may be, it is certain Newton was familiar with Bacon's works.

In the *Chemistry* of modern times, also, we have the most astonishing examples of the success of the inductive, or experimental method. Until



this was employed, no part of science was more fanciful: so that it has justly been remarked, that chemistry, in the middle ages, might be said to have an *elective attraction* for all that was absurd and extravagant in other parts of knowledge. It is true that, before the darkness of these ages had passed away, *Paracelsus* conferred great benefits on the world by the application of chemistry to medicine; and *Van Helmont*, notwithstanding the extravagancies with which his imagination was filled, by the discovery of elastic fluids, did his part to form the new chemistry; but it was the work of those who have had the opportunity of thoroughly imbibing the spirit of the Baconian philosophy, as applied by Newton, effectually to deliver chemistry from quackery and romance; and to frame such a system as that which now exists.

Lord Bacon, in support of the importance of the *inductive* method, lays down the following fundamental principle, as his first and leading *aphorism* concerning the "Interpretation of nature, and man's dominion over it"—a principle which, obvious as it seems, had never been properly acted on by philosophers:—"Man, the servant and interpreter of nature, can only understand and act in proportion as he observes or contemplates the order of nature; more he can neither know nor do." This general principle of Bacon is undoubtedly the foundation of all our real knowledge. The science of the philosopher differs in degree only, *not* in kind, from that information which is the fruit of the commonest experience. Everybody knows that cold produces ice and snow; that the sun is higher in the sky in summer than in winter; that in pits and mines the air sometimes burns, and explodes like gunpowder. Now the moment we depart from these mere facts, and begin to consider their causes, and in what circumstances they are likely to happen again, we begin to apply *experience* to science—we reason by *induction*. It cannot be doubted that this inductive method is, to a certain extent, natural to the mind. The foundation of it lies in our expecting the *same effects from the same causes*; for this is the groundwork of reasoning from particular facts to general, or what is called "*generalisation*." This expectation seems to be an original principle implanted in the human mind by the beneficent Creator; and without which we could know nothing, and never be safe from danger. It goes before experience, and is the guide of it. A child who for the first time approaches too near the flame of any substance that is in a state of combustion, or burning, so as to hurt himself, afterwards proverbially dreads the fire; connecting in his mind the remembrance of the pain he has felt, with the touching of any part of his body with the flame. It is evident he expects the same effect to follow from the same or a similar cause; and the resemblance between the flame of a candle and that of the fire would, it is likely, put him on his guard against a similar disaster from that source also. Now, this is a species of *induction*, though not founded on an enlarged experience; and it is probable the child will now come to have the same fear of everything bearing the appearance of flame. He might expect that the same effect must arise from contact with the flame of *alcohol*, or spirit of wine, for instance, until informed that it was possible to touch this without being burnt. Hence the necessity of a sufficient experience, before we form any general principle.

A remarkable instance of this necessity, and one drawn from the more exact part of science, is mentioned by Euler, in his Memoirs of Berlin. It happens that in the formula $x^2 + x + 41$, if $x$ be made successively equal to 0, 1, 2, 3, 4, 5, etc., the results will be a series of which the first forty terms are all *prime* numbers—that is, numbers which have no divisors, or which cannot be divided into any number of equal integral parts, less than the number of units of which they are composed: hence it might be supposed the law was general;—or, in other words, for the sake of any of our readers who have not made themselves acquainted with algebra, that any number whatever, multiplied by itself, and then added to itself, together with the number 41, would make a prime number. It happens, however, that in the very next, or forty-first term, the result is a *composite* number—that is, a number that can be divided by some smaller number, without a remainder; and thus the rule is false. Now, it is the great design of the *Novum Organum* to point out the method of a strict and enlarged experimental, or inductive reasoning, especially, though by no means exclusively, in reference to the study of *physics*, or natural philosophy. This work may be regarded as a more useful and more extensive system of reasoning than any that went before it; not consisting of *syllogisms* and the modes of argument that were then in use, which, however correct, provided the premises be true, could, after all, only serve for the arrangement of truths already known, or for detecting very obvious and gross fallacies in argument, and for classifying such truths and fallacies, but an art leading to invention, and productive of discoveries of the highest importance to the general uses of human life. These discoveries are proposed to be accomplished by turning our attention from mere words to things themselves; from all those frivolous and childish speculations which only dazzle without illuminating the understanding, to a sober and rational method of investigating the operations and laws of nature,—a method well calculated to recommend itself to those whose only object is *truth*.

Lord Bacon sets out by condemning the two opposite errors, which up to his time had proved equally injurious to a just acquaintance with nature; the one that of magisterially pronouncing on her operations, as if *all* were explored and known, and nothing further were to be discovered; by which supposition all inquiry would of course be prevented as useless; the other error that of the sceptic philosophers, who, proceeding to the opposite extreme, declared that *nothing* can be known, and endeavoured, by distrusting the clearest notices of sense and consciousness, to convince themselves of this absurd and inconsistent notion. Those of the ancient Greeks were more worthy of our imitation, whose writings are now lost, but who seem to have held a middle course; and though they complained of the mystery in which nature often wrapped herself, still kept on their pursuit, and did not allow themselves long to lose sight of their object. Even these philosophers, however, do not appear to have applied a sufficient *rule* and *method* in their inquiries, but placed too much reliance on subtilty of mind, and random conjecture. The art of logic, so much extolled by the ancients, certainly came too late to minds already prepossessed by error: hence, by the perversion of this instrument, the aberrations



of the human understanding were only fixed and rendered permanent, instead of being corrected and removed; the chains of prejudice were rivetted, and loaded with gaudy ornaments. It is evident that the mind needs direction and regulation, by some right method of employing its faculties, as much as the body needs the assistance of the mechanical powers in raising large and heavy weights. In such a method the ancients were altogether deficient. Yet by way of conciliation, Bacon observes that he is still perfectly willing to leave the ancients in possession of all the honour that is due to them. The method of science, however, here proposed, being so little known to them, no room, he conceives, is left for rivalship and envy. He contends not for victory, but for utility and truth. If any persons, from want of time, or other causes, are unable to pursue this more laborious method, he says they may still attempt what they can, by framing systems and theories, which he terms the mode of *anticipation of the mind*; others, who are more worthy sons of science, must follow *his* plan of induction, or *the interpretation of nature*, as it is here laid down, a method on which it is the more necessary to insist, because many examples have occurred since Bacon's time, of the bad consequences of neglecting it. Of this, no less names than *Descartes* and *Leibnitz* were early examples; men endowed with every faculty of the mind that most fits for philosophical investigations—with the happiest genius for science.

The body of the Novum Organum is divided into two general parts. The former of these, which is intended to introduce the latter, is calculated to prepare the mind for receiving and employing the doctrine contained in the second part, which delivers the new method of proceeding in all kinds of inquiries, in order to the acquisition of a more accurate knowledge of the works of nature, and a more extensive dominion over it. As the whole book is quaintly divided into *aphorisms*, or short portions, founded on sententious remarks, and accompanied with illustrations, we shall not attempt to conduct our readers through each of these portions separately, which would be almost to present the whole; but hoping that those who have the opportunity of doing so, will feel induced to read the original work, or a translation of it, for themselves, we shall simply endeavour to condense its principles, and shall throw it into sections adapted to our present purpose.

### I. *General Prefatory Remarks.*

The first thirty-seven aphorisms, which we may call our *first section* of the former part of the work, are chiefly occupied in attempting to remove ancient prejudices, and to procure a fair and candid attention to a book which, at the time of its publication, must have had so much to contend against. It is deplored by Bacon, that for want of a right method of study, little effects had resulted, up to the close of the sixteenth century, from the labours of men engaged in the pursuit of science; for knowledge is the same thing as power, and where there is little sound knowledge of nature, there will be little power gained over her. This must always have been the state of things, unless means before untried had been employed in the improvement of the

sciences. That improvement could not be left to mere accident as heretofore, when each following age only re-echoed the voice of the preceding, and contented itself with pompously extolling the existing delusive methods of philosophy, to the neglect of one more genuine and scientific. The philosophy of nature Bacon compares to "a vast pyramid, which ought to have the history of nature for its basis:" those who strive to erect it by the force of abstract speculation, he likens to the giants of old; who, according to the poets, endeavoured to throw mount Ossa upon Pelion, and Olympus upon Ossa. The only hope on which to found all real advancement in knowledge, must arise from a strict experimental method, that is, the examination of a sufficient number of particular instances on both sides the question at issue, so that when all the exceptions are properly made, some useful and important truth may remain as a principle to proceed on, in further inquiry. When examined on this inductive principle, most of the common notions existing when the *Novum Organum* was written, were quite unsatisfactory: those, for instance, relating to *gravity*, *attraction*, the *elements*, *matter*, *form*—all these, and many more, as taught in the sixteenth century, were but ill-defined and fantastical notions. Even many of our common-sense ideas, as those relating to our sensations and reasonings, though they can scarcely in themselves greatly deceive us, yet may these be much obscured and perplexed by a false mode of philosophizing. For instance, the supposed necessity of the objects of sense being actually present with the mind that perceives them, gave rise to the *notion* of *images*—an image of a horse must be *in* the mind, or the horse could not be seen; whereas, it is evident, that *seeing* is a fact in the nature of man: how the impression is conveyed from the nerves and brain to the mind, we know not.

The mode of searching after truth that had always been in vogue was, at the best, from observing, not very rigidly, a few particulars, to rise at once to some *general* axiom or conclusion; but the only genuine method, Bacon observes, is, to advance gradually from the notices the senses give us in particular instances, and those sufficiently numerous, to some *lesser* axiom or principle, and then gradually to proceed to some still more general principle, till at length you form some grand and final conclusion. The understanding seems but too naturally to adopt the former of these two methods, which is calculated most effectually to prevent all advances in knowledge and science. It is the object of science to see things as they are in nature, and not in appearance merely: but "there is a wide difference," says Lord Bacon, between the *idols* of the human mind, and the *ideas* of the divine mind: that is, between certain vain notions, and the real characters and impressions that are stamped upon the creatures, as they are actually found." We may illustrate this by a reference to the Ptolemaic System of Astronomy, which was founded on the false and hasty notion of the *apparent* motions of the heavenly bodies being the *real* ones. The sun, moon, and stars, seem to move round the earth once in twenty-four hours: hence the rude and gothic notion that the earth was the centre around which they are all actually whirled; whereas, by a successful cultivation of a proper method, the truth is now demonstrated to be that the sun, and not the earth, is the centre



of the mundane system; and is, with respect to the earth at least, nearly at rest. "The method of *anticipating nature*," says Bacon, "rash, hasty, and unphilosophical as it is, has nevertheless a much greater power than the other, to entrap the assent of the mind; which is too apt to be delighted with its own conjectures, and to allow the imagination to be struck and filled with its own plausible subtilties: whereas *interpretations of nature*, or real truths arrived at by induction, being separately and more slowly collected, cannot so suddenly arrest the mind; and when the conclusion actually arrives, it may so oppose prejudice, and appear so paradoxical, as to be in danger of not being received, notwithstanding the evidence that supports it, "like mysteries of faith."

The method of *anticipation*, however, or of dictating to nature what she and her operations are to be, could never, of course, avail to promote real science, whatever talents might be engaged in it. *Tycho Brahe* thus *anticipated* nature, in taking it as a certain truth that the earth must be at rest. For though he was too well acquainted with the planetary motions to suppose their centre any other than the sun, yet in order to preserve his favourite notion that the earth did not move, he supposed the sun, with all the planets, to be carried annually round it; while these latter revolved in their proper orbits round the sun: and having rejected the Copernican doctrine of the daily motion of the earth round its own axis, he was obliged to retain the most violent part of the system of Ptolemy, and to suppose that the whole universe was carried round the earth every day. It was thus, also, that the great *Kepler*, the contemporary of Bacon, imagined that the planets *must* be *six* in number, and must have orbits of certain dimensions, because of certain properties of numbers, and of plane and solid figures, with which he fancied they corresponded. These speculations he published in 1596 in his "*Mystery of the World*;" and on sending a copy of his book to Tycho Brahe, he received from him the advice, "first to lay a solid foundation in *observations*, and then, by ascending from them, to strive to come at the causes of things." To this excellent advice, as Maclaurin observes, we owe Kepler's more solid discoveries: for, availing himself of Tycho Brahe's astronomical observations, he, from them, discovered the laws of the planetary motions, known ever since by his own name. *Huygens*, a celebrated Dutch geometrician and astronomer, and who lived later, suffered himself to be imposed on in a similar way: for, having discovered one of Saturn's moons, this, added to the four moons of Jupiter, and the one belonging to our globe, made up the number six; the number of the primary planets then known being also six; and the number six being a *perfect* number—that is, a number that is equal to the sum of the equal parts into which it can be divided, Huygens affirmed that the number of the planets was complete, and that it was in vain to look for any more: we need not remark that this mystical speculation has since been disproved by fact. Now it was the praise of Lord Bacon to endeavour to remove from men's minds this superstitious tendency to rest in preconceived notions, which so much prevailed, and which was encouraged by some who were greatly his superiors in the abstract sciences. "Though the labours and

capacities of all men," says he, "in all ages, could be united and continued, they could effect no considerable progress in science by *anticipation* of nature; since radical errors in the mind's first digestion are not to be cured by the excellence of its functions, or by any succeeding remedies. Unless men choose to move always in a circle without advancing, we have but one simple method left; namely, that of leading them to particulars, to their order and connection. They must be contented, for a time at least, to forsake their own notions, and to become acquainted with things themselves. Our method has some resemblance to that of the Scepties at the outset, but differs widely from it, and is directly opposed to it in the end. They foolishly assert that nothing can be known: we say that little is to be expected from the existing method; they contradict reason and common sense; we endeavour to assist both."

II. *The Idols of the Mind; or Grand Sources of Prejudice.*

Lord Bacon philosophically points out, with great exactness, various general sources of those *errors* which men are apt to commit in forming their notions of things; and he shows how very great an obstacle they form to the progress of our knowledge, and the acquisition of truth. "The *Idols*, or false notions of the mind," he says, "so deeply fix themselves in it, that they not only shut up the avenues through which truth might enter; but even when it has entered, they will again be presenting themselves, and will be troublesome in the advancement of the sciences, unless men, being aware of them before hand, guard against them with all possible diligence." As no part of Bacon's works is more valuable than this, or more important to all who are in pursuit of knowledge and truth, we shall give some detail of it to our readers. He strikingly, though in his usual quaint style, calls the prejudices that check the progress of truth, by the name of *Idols*, because mankind are apt to pay homage to these, instead of regarding truth; as they have offered to imaginary deities, the worship which is due only to the true God.

These prejudices and prepossessions are divided into four classes, which are called *Idols* of the *Tribe; Idols* of the *Den; Idols* of the *Market;* and *Idols* of the *Theatre*. These sources of error are peculiarly deserving of notice, because they will be found, if we mistake not, to include the principal causes, which in all cases have a tendency to obstruct the pursuit of truth, whether natural or moral. They constitute a sort of infection from which the mind must be purified, before it can enter with soundness and vigour, and with the best effect, into any sort of inquiry which has truth, and truth only, for its object. "While the rules Lord Bacon gives us," says the late Dr. Thomas Brown, "are rules of physical investigation, the temple which he purified was not that of nature itself, but the temple of the mind; in its inmost sanctuaries were all the idols which he overthrew; and it was not till these were removed that Truth would deign to unveil herself to adoration."

1. The *Idola Tribus*, or the *Idols* of the Tribe, the *first* class of prejudices, are so called because they are common to the whole *tribe*, or *race* of mankind; they are, in fact, *those general prejudices which arise*



*from the infirmity of human nature itself.* "The understanding of man," says our author, "is like a mirror whose surface is not true, and so, mixing its own imperfection with the nature of things, distorts and perverts them." For instance, there is a tendency in the mind to suppose a greater *uniformity* in Nature than she actually possesses. We are always disposed to imagine parallels, correspondencies, and relations that may not actually exist. Hence the supposition that the heavenly bodies must all move in perfect circles, because the orbits of the planets were perceived to return into themselves: this was universally believed by the old astronomers, till Kepler disproved it a few years before Bacon wrote, by showing that the planets move in elliptical or oval orbits. Hence the ancient notion that the element of fire, with its *orb*, must be added to air, earth, and water, to make up the *even number* of what they called the *four elements*. Bacon's prediction that the sources of error would return and be likely to mingle with science even in its most flourishing condition, has been verified with respect to this particular illusion, in the case of sciences which in his time were scarcely in existence. When it was found that a considerable part of the earth's surface consisted of minerals, disposed in horizontal strata, or layers, it was immediately concluded that the whole exterior surface either is or has been composed of such layers; and on this assumed principle entire theories of the earth have been constructed.

Again, the mind has a wonderful facility also of being imposed on by *prepossessions*. If once pleased with any notion, it immediately endeavours to make every thing agree with this, even in the face of evidence to the contrary. It gets over opposing instances and examples, either by altogether neglecting them, or by inventing some subtil distinction which shall still maintain the favourite principle with which it first set out. Dreams, omens, and astrological predictions are cases of this kind, in which the instances of failure are passed over by the superstitious with little notice, while those instances in which the event corresponds to the supposed preternatural intimation of it are carefully remembered. This prepossession of the mind cannot endure exceptions to rules, and negative instances; though these are, in fact, of the greatest importance in establishing axioms or general principles.

The *imagination*, also, is apt to be overpowered with whatever at once strikes and seems to fill it; and the mind, imperceptibly yielding to this impression, readily comes to some conclusion, not waiting for the gradual processes of the understanding, to try general principles by the test of various, remote, and dissimilar instances; which can never be done without following rigid rules, and submitting the faculties to violent restraints.

The *restless activity* of the human powers, moreover, aids the force of general prejudices. The mind is ambitious of understanding what is incomprehensible. It attempts to grasp what is beyond its power, instead of being content with some proper resting-place for the natural weakness and limitation of its faculties. It wearies itself in its endeavour to comprehend such ideas as *space, time, eternity, infinity;* and it is still more apt to be misled, Bacon thinks, by its desire to discover the *final causes* of things, that is, the *uses*,

*or ends*, which the Creator had in view in forming them. The phrase *final cause* was first introduced by Aristotle, and the inclusion of this among *causes* in general as objects of inquiry, had the effect of diverting such minds as those of his followers from the study of nature to mere speculations. We must therefore remember that the hint which Bacon here throws out on this subject, and what he says more on it in his other works, always has a reference to *final causes* as treated by the Schoolmen. He objects to these being included, as a branch of *natural* science; but it cannot be supposed that his remarks on this subject arose from the same source which produced the prejudice against final causes that so generally prevailed in France in the eighteenth century. Bacon had no bias towards atheism: he censures Aristotle for "substituting Nature instead of God, as the fountain of *final causes;* and for treating them rather as subservient to logic than theology;" and in his Essays he finely remarks, "I had rather believe all the fables in the Legend, and the Talmud, and the Alcoran, than that this universal frame is without a mind. While the mind of man looketh at second causes scattered, it may sometimes rest in them, and go no farther; but when it beholdeth the chain of them confederate and linked together, it must needs fly to Providence and Deity."

Notwithstanding Lord Bacon's objection to final causes as a subject of philosophical inquiry, it must be allowed that, apart from the charm which the final causes, or ends of things, lend to Nature, when they are satisfactorily perceived, which is the moral use of them, there are some cases in which a consideration of them has conduced to actual discoveries in science. It was noticing the situation of the valves in the veins of the animal body, for instance, that led to the great discovery of the circulation of the blood. Harvey, who was its author, perceived that these valves, in some parts of the body, were so placed as to give a free passage to the blood towards the heart, and to exclude its return the same way. He thought there must be some particular *design* in this, and no design appeared more probable than that, since the blood could not well, because of the interposing valves, be sent by the veins to the limbs, it should be sent through the arteries, and return through the veins, whose valves did not oppose its course that way. This fact, however, and others which might be mentioned in illustration of this subject, were not known to Bacon; and the great abuse of the speculation on final causes by the Schoolmen not unnaturally led him to an unreasonable distrust of it.

The *influence of the will and affections on the understanding*, or what may be termed the *moral* state of the mind, may also greatly affect our opinions. "The light of the understanding," says our author, "is not a dry or pure light, but it receives a tincture from the will and the affections, and forms the sciences accordingly; for men are most willing to believe what they most desire." Hence, he observes, "difficulties are rejected through impatience; the deeper things of Nature are dreaded through a certain awe; experience is discarded through pride; truth when it limits our hopes; paradox is shunned through fear of vulgar opposition; and thus in innumerable ways, and often imperceptibly, do the affections and passions tinge the understanding with their own colouring."

The *fallacy and incompetency of the senses* are an additional



source of mistake and error. Inquiry commonly ends in what is seen on the mere surface of things, while the organization, the texture, or the inward changes of bodies are unknown. On these, however, chemistry depends." Lord Bacon considers this incompetency and dulness of the senses as one of the greatest impediments to an exact knowledge of nature. "Nor can instruments," he adds, "here be of any great service, since all true interpretations of nature must be made by suitable and proper trials, in which the senses judge of experiment only, and experiment is the judge of nature and fact." He complains, by way of example, that in his time even the properties of the common air of the atmosphere, and of all the agents, still more subtil than the air itself, of which he supposed there might be many, were almost entirely unknown. What would he have said, could he have witnessed the application of the inductive philosophy to the discovery of the properties of the various kinds of *gases*—the researches of Newton respecting *light*—the experiments of Franklin in *electricity*—the powerful agency of *galvanism*, which has produced new creations in chemistry, and changed the whole face of that interesting and useful science!

Lastly, there is a tendency in the mind to *abstraction or generalisation*, which should be carefully watched as a likely source of error. It is less troublesome to reason upon fancied general notions, than to make experiments. "But Nature," says our author, "must be anatomized rather than abstracted: matter should be considered in all its states and transformations; so ought motion and its laws; but for the Aristotelian abstract *forms*, they are *idols* or *figments* of the mind."—These seven particular causes, then, may be borne in mind as among the chief general prejudices, which are apt, often insensibly, to militate against the discovery of truth, and the advancement of science: too great a tendency to suppose a *perfect uniformity* in nature; *hasty prepossessions* in respect to some *favourite idea;* the influence of the *imagination;* the *restless activity* of the human mind; the bias the *will and affections* give to the judgment; the *imperfection* of the *organs of sense;* and the love of *abstractions and generalisations*.

2. The *second* class of prejudices introduced by this sagacious observer of human nature, as tending to obstruct the progress of truth and knowledge of all kinds, he terms *Idola Specus*—Idols of the *Cave or Den:* that is, *those prejudices which stamp upon each mind its own peculiar character, and are identified with every individual man.* "Idols of the den," says the *Novum Organum*, "are the idols of each particular person; for in addition to the general waywardness of human nature, every man has his own peculiar *den* or *cavern*, which breaks and corrupts the light of nature,—either on account of his constitution and disposition of mind—his education and the society he keeps—his course of reading and the authorities he most respects—his peculiar impressions as they may be made on a mind that is pre-occupied and prepossessed, or is in a calm and unbiassed frame: so that the human spirit, as it is differently disposed in different individuals, is a thing fluctuating, disorderly, and almost accidental. Hence Heraclitus well observes that men seek the sciences in their lesser worlds, and not in the great and common world of nature." In another place, these idols of the den are spoken of in the figurative language of Bacon, as "each man's

particular demon, or seducing familiar spirit;" and again, every mind is compared to "a glass, with its surface differently cut, so as differently to receive, reflect, and refract the rays of light that fall upon it."

Some of these private prejudices he justly regards as requiring peculiar caution, because they possess the greatest tendency to pervert the mind. The *particular studies*, for instance, to which a person has been addicted—more especially, if he has any claim to be an inventor, may warp his judgment in other pursuits, and tend to corrupt his notions. It was in this way that Aristotle, through his fondness for distinctions and quiddities, made his natural philosophy a mere slave to his logic, and so rendered it little else than a useless source of disputation. *Gilbert*, of Colchester, is another example. In his "*Treatise on the Magnet*," he gives a specimen of experimental inquiry carried on with considerable correctness and success; but he tried to make his magnetism a general principle, considering it to pervade all Nature. It is but fair to acknowledge his merit however, for "to him," as Dr. Priestley observes, "we owe a great augmentation of the list of electrical bodies, and of the bodies on which electrics can act: though his theory on this subject is imperfect, he may justly be called the father of modern electricity." Of late years, this species of fondness for theory has been discovered in attempts to account for the motion of the planets by electricity; and electricity and galvanism together have been employed to explain gravitation, the affinities of chemistry, and even the laws of vegetable and animal life. At an earlier period Des Cartes, after Bacon had so well written against theories, endeavoured, in medicine, to combine Van Helmont's doctrine of *fermentation* with his own beloved notions respecting *vortices*; which he thus brought down from heaven (where, as he supposed, they guided the planets in their orbits) to earth, in order to explain the chief functions of the animal body. Hence he formed a chemico-mechanical system of medicine which was eagerly received by the Dutch physicians of his time. Thus may one favourite pursuit be suffered to give a tincture to every other branch of knowledge, and to corrupt it. "The tribe of chemists," says Bacon, "have constructed a fantastical philosophy from a few experiments of the furnace." None certainly of the professed inquirers after truth, up to his time, were ever more extravagant and fanciful than the experimenters in chemistry; witness the Archæus of Van Helmont, and his army of spiritual agents, derived from the elastic fluids.

Among the private prejudices or the sources of error arising from the mental constitution of individuals, the natural *difference of men's capacities* is enumerated. Some minds, Lord Bacon thinks, are fitted more for discrimination, while others content themselves with merely noticing resemblances. "The great and radical difference of men's capacities," he says, "as to philosophy and the sciences, lies in this, that some are stronger and more fitted to observe the differences of things, and others to observe their correspondences: for a steady and sharp genius can fix its contemplations, and dwell and fasten upon all the subtilty of differences; whilst a sublime and ready genius perceives and compares the smallest and most general agreements of things. Both minds easily fall into excess, by grasping either at the dividing scale or the shadows of things."

With greater clearness and perspicuity, he adds to these personal



prejudices and tendencies, the *attachment to times*, in forming our ideas of truth and excellence. Some men have cherished an idolatrous admiration of the ancients; and have scarcely allowed even a comparison to be made between their works, and the monuments of modern genius. Thus the poetry of Milton has been underrated by those who have been so devoted to the remains of classical antiquity, as to be almost incapable of awarding due merit to productions in the vulgar tongue: witness the contests respecting the superiority of ancient or modern learning. On the other hand, while every thing modern has been despised only because it is not ancient, some have been misled by the opposite cast of mind, and have been inflamed with a constant passion for novelty; being disposed to yield little or no respect to antiquity, even where the experience of past ages might be of great service to us. This kind of prejudice has greatly declined, however, since Bacon's time—*truth*, and not the establishment of sects, having happily become the leading object of philosophical inquiries; "for truth," says he, "is not to be derived from any felicity of times, which is an uncertain thing, but from the light of nature and experience, which is eternal."

He exemplifies another kind of *particular* prejudices, or of the *Idola Specus*, by comparing the school of Leucippus and Democritus, among the ancients, to the "other philosophies," alluding probably to those of Pythagoras, and of Socrates, Plato, and the Academics. Leucippus, Democritus, and Epicurus were *atomists*,—they taught that the whole universe is composed of either *atoms* or a *vacuum*, and that it was by the accidental meeting together of these atoms that the world assumed its present form and appearance. "This school," says Bacon, "is so taken up with the particles of things, as almost to neglect their structure; whilst the other views the fabrication of things with such astonishment, as not to attend to the simplicity of nature;" referring to the lofty speculations and flights of imagination that characterized the Platonic school. "To contemplate nature and bodies in their simple elements," he quaintly remarks, "breaks and grinds the understanding; and to consider them in their configurations and compositions blunts and relaxes it." This *exclusive predilection for the minute or the vast* in nature, by which some of the ancient schools were marked, much resembles the second order of prejudices which is mentioned under this class. "In this manner, then," concludes the account of these prejudices, "let contemplative wisdom proceed in dislodging and chasing away the *idols* of the *den*, which principally have their rise from *prevalent studies; excess of composition and division; affections for times*; and from the *great or small size of objects*."

3. Another class of prejudices to be carefully avoided in our inquiries after *truth*, are termed, in the figurative but expressive language of Lord Bacon, *Idola Fori; Idols of the Market-place;* that is, *prejudices arising from mere words and terms in our common intercourse with mankind:* they proceed, in short, from the *imperfection of language*. These prejudices he pronounces "the most troublesome of all." "Words," says he, "are for the most part accommodated to the notions of the vulgar, and they define things by bounds that are most obvious to common minds; and when a more acute understanding, or a more accurate observation, would remove these boundaries, and

place them more according to nature, words *cry out and forbid.*" A familiar instance of this may be taken from our common mode of speech with regard to the heavenly bodies. We say of the *sun*, that it *rises* and *sets*, though every one, but the most ignorant, is aware that this is not strictly true, since the sun is stationary with regard to the planetary system; its *apparent* motion being owing to the *real* motion of the earth. In this instance, however, the delusion which words might produce, is obviated by the popular knowledge of astronomy which prevails. In many cases it is certain that the want of accuracy in the use of words and phrases has proved a great barrier to the pursuit and attainment of truth. How many violent disputes have there been, for instance, on *liberty* and *necessity* among ethical writers, while neither party has taken the pains first to say what he meant by these words; which might have saved both much time and much angry contention. Hence, in order to avoid controversies respecting mere words and terms, it is recommended to begin with these according to the "wise method of the mathematicians," and to reduce them to order and certainty by *definitions*. "Yet," it is justly observed, "these definitions themselves cannot wholly remedy the evil; for definitions consist of words, and words produce words; so that recourse must be had to particular instances."

Lord Bacon's meaning may be illustrated by such words as *sensation*, *will*, *benevolence*. We may define sensation, and say it is *feeling*, but what is *feeling?* What, for instance, is the feeling or sensation of *cold?* What is the sensation of *seeing?* None can describe these, it is obvious, to a person supposed never to have experienced them. *Will* may be defined *volition*, but this again is a mere translation; and if an intelligent being could be imagined who had never actually *willed any thing*, nor ever had any *desire* in his mind to do or say any thing, it would be utterly impossible to make him understand what *willing* is. A being of simple malevolence, or one who had never felt towards other beings any thing but *hatred*, could have no idea of the emotion of *benevolence* towards others: he could not know what it is to love them. But when a child once understands that *sensation* is a general name for all those immediate effects which arise from objects acting upon any of the organs of sense—a name for *seeing*, *hearing*, *smelling*, *tasting*, and *feeling* indifferently; when he learns that *willing* is that state of the mind which directly goes before any deliberate action; or that *benevolence* or *love* is a term expressing certain natural and delightful emotions towards his parents, brothers, sisters, and friends,—he then understands the meaning of these words by instances and examples. Or, if I wished to convey to the mind of another person the meaning of the word *gravitation*, or *attraction*, as it is employed in the Newtonian philosophy, instead of merely saying it is the *tendency* bodies have *towards each other*, I might state the simple fact, and say, when a body is let fall from any height it proceeds invariably to the earth, and more swiftly in proportion as it arrives nearer the surface: this is what is meant by saying that the body is *attracted*, or *gravitates* with accelerated velocity toward the earth: and when the inquirer is further informed that the earth itself also proceeds, however little, toward the falling body; and that the sun, moon, earth, and planets, all mutually move toward each other, more or less, in the same manner, the general idea of what is intended by attraction or gravitation is gained; and it is understood simply to be a name for a certain *fact*, or *law* in the operations of nature, or rather of nature's Divine and Almighty Architect.



Mankind are apt to be led into errors by words in *two* principal *ways*; and first by the names of *things* which have *no existence* whatever. Of this kind, says Lord Bacon, are such as "fortune, the primum mobile, orbs of the planets, the element of fire, and the like figments which arise from false and imaginary theories." It is almost unnecessary to remind our readers that all such words as *chance*, *fortune*, *luck*, etc., are only names for human ignorance of a cause; and that in all the cases in which these words are applied to any kind of circumstances that occur either in the natural or moral world, there is the same necessity for supposing an agency of the Deity as in the greatest, and, to us, most certain events. *Primum mobile*, or the first mover, in Ptolemy's astronomy, was a supposed immense sphere, or hollow globe, which included within it all the spheres, or *orbs of the planets*, and fixed stars, and turned itself and all these round the earth in twenty-four hours! Idols of this kind, however, it is observed, are the more easily dislodged from the mind, because the direct remedy for them is the constant rejection of all mere theory.

But there is another species of delusion which may arise from words, that is likely to produce greater perplexity, and is avoided with greater difficulty. This delusion is produced *when words do not agree* to the *things* they are intended to signify, but are confused and ill-defined. Bacon adduces the various meanings that were formerly given to the word *humidum*, or *moisture*, as an example of this uncertainty: he shows that, according to the vague manner in which the word was used, it would apply to the most dissimilar things, and that *flame*, and *small dust* or *powder*, and *glass*, might all, on this principle, be said to possess *moisture*. It is evident that this uncertainty in the application of the term *humidity* or the quality of *moisture* arose from not considering moisture as a *relative* idea. For instance, quicksilver, with relation to some substances, as our hands or our clothes, is *not humid*, but it may be regarded so with reference to tin, lead, or gold; for it will adhere to their surfaces and render them soft and moist. Even water does not wet all things, for it runs off in round drops from the leaves of many plants, the feathers of birds, etc.; so that water itself is no more moist with regard to these, than quicksilver is with regard to our hands; unless by moisture we mean soaking with water merely. Our great philosopher complains that, in general, the notions of *quality* in bodies, were in his time exceedingly confused. Such were the notions of *gravity*, *density*, *tenuity*, *levity*. From what we know, indeed, of the philosophism which then prevailed, all attempts to reason on these terms must have been like grasping a shadow or beating the air. The words used to express the *changes* which bodies undergo, were also extremely vague and undefined, as *generation*, *corruption*, *alteration*. So likewise general names of substances, as *earth*; and *air*, or vapour. It was reserved for the science of modern times to use a more precise language, and to aspire at a magnanimity almost unknown to the ancients—that of frankly acknowledging man's ignorance, and the limitation of his faculties, rather than taking refuge

in the darkness of an ambiguous phraseology. Our readers will perceive from all that has been said, how much accuracy and precision of language depend on the advancement of science; indeed they mutually promote each other. What has been effected in chemistry by a reformation in the use of terms is well known. An imitation of this precision, so far as the nature of the given subject will allow, must lie at the root of advancement, not only in natural, but equally in moral and intellectual science; and here, as in chemistry itself, the advice of Bergman to Morveau will advantageously apply: "In reforming the nomenclature, spare no word that is improper."

4. The last general sources of prejudice adduced, as obstructing philosophical discoveries, are what are termed *Idola Theatri*: Idols of the Theatre; or the *prejudices and perversions of the mind arising from the fabulous and visionary theories and the romantic philosophies* that so long prevailed in the world. "We call them Idols of the Theatre," says Bacon, "because all the systems of philosophy that have been hitherto invented, or received, are but so many stage-plays which have exhibited nothing but fictitious and theatrical worlds; and there may still be invented and dressed up numberless other fables of the like kind." Of this last remark, *Hutchinsonianism* may, in modern times, be regarded as an example, in common with all other speculations that have been opposed to the Newtonian theory of gravitation; and which will be found equally opposed to the method of science here recommended. It was strange that, in the eighteenth century, in the full blaze of that light which was, as it were, *latent* in the Baconian philosophy, and which Newton had struck out—a system, not unlike that of the *vortices* of Des Cartes, should offer once more to darken the heavens, after they had been so effectually purified from the *atoms* and the *plenums*, the *orbs* and the *cycles* of an imaginary astronomy: this, however, is but an example of the power which one favourite notion can exercise over an acute and ardent mind; for Hutchinson assumed, as the basis of his theory, that Divine Revelation was designed to teach men philosophy as well as religion; and in the Mosaic account of the creation, he fancied he saw the physics of the true astronomy. His system, however, which may be considered as a kind of physico-theological romance, has been permitted to sink into its merited oblivion, while Revelation is now regarded as confined to its own sublime and proper province of making known the will of God to man, as to his conduct here, and the way of attaining felicity hereafter. The Newtonian philosophy cannot, on any consistent principles, be regarded as at variance with the communications of the Bible; and, founded as it is on the basis of *demonstration*, it cannot fail to stand the test of time. Gratuitous theories may impose on the imagination, like the *mirage* of the Egyptian sands; but, like this illusion, they must pass away: they may present to the eye a magnificence as gaudy and seducing as the *fata morgana*, sometimes witnessed on the coast of Calabria, in which the most beauteous landscapes, crowned with picturesque villages, superb palaces, and massy towers, seem to possess a real existence: all, however, is only suspended in the air, and the enchanted scene changes with the least shifting of the light, or the ruffling of the sea, melting away like a dream of the night—so must vanish at last all systems of philosophy and science that are not



founded on the solid basis of that *induction*, which it is the design of the *Novum Organum* to explain.

This source of error and prejudice, or the *Idols of the Theatre*, are more especially to be marked as closely connected with the *authority of great names*; and thus, not unfrequently, enslaving the understanding to an ignoble bondage, by what the schoolmen term *argumentum ad verecundiam*, or the argument addressed to the modesty of human nature. Prejudices of this kind stand on a different footing from the former three sources, and are perhaps the most remarkable instances of intellectual slavery. "For," says Lord Bacon, "the idols of the theatre are neither innate, nor are they secretly insinuated into the understanding, but are plainly forced upon it, and are received from fabulous theories and *false* laws of demonstration." The importance of returning to an independent and scientific method of inquiry, or, in other words, of thinking for ourselves, is urged by our author from the fact, that "a cripple in the right way may beat a racer in the wrong." The more vigorous, indeed, the mind is, which sets out in a wrong course, the further does it depart from the goal of truth and science. The method, however, which is here proposed, is adapted not merely to a subtil understanding, and a sublime order of faculties, but is level to the capacities of all, even the humblest. To draw a straight line, or to describe an exact circle, with the unassisted hand, might be a thing scarcely to be accomplished with certainty, whilst it is an easy task to do it by the help of a ruler and compasses, with the greatest accuracy. "All these idols," says Bacon, "are solemnly and for ever to be renounced, and the understanding must be thoroughly cleared and purged of them; for the kingdom of man, which is founded in the sciences, cannot be entered otherwise than the kingdom of God—that is, in the condition of a little child."—In further illustration of these prejudices, *some notice* is proposed to be taken of the *sects* and *kinds* of these false theories; of their *outward signs and indications*; of the *causes* of this so great disadvantage to science; and of the reasons of so lasting and general a consent in error.

### III. *Different Kinds of false Systems of Philosophy.*

The next topic of the *Novum Organum* relates to the *different philosophical theories* which have given rise to the last of the four classes of prejudices; or the *Idols of the Theatre*. Fanciful and imaginary systems of philosophy derive no small charm, it is well observed, from their being so highly wrought: thus, to many, the fictitious drama is more attractive than true history. Lord Bacon divides these visionary systems into *three* general kinds—*sophistical*, *empirical*, and *superstitious*.

*Sophistical* philosophies, so called from their deceitful pretences, are those formed on careless and hasty observations and experiments, and filled up by the mind of the inventor at his own pleasure. Of this kind Aristotle's philosophy is a very eminent instance, among the other ancient systems, which were chiefly of the sophistical kind. Even the *similar particles* of Anaxagoras, the *atoms* of Leucippus and Democritus, the *heaven and earth* of Parmenides, and other *first principles* of the different sects of Greece, with all their incongruity, at

least savour somewhat of natural philosophy and experience: but Aristotle, both in his Physics and Metaphysics, utters little else than mere logical terms. Even in some of his other writings, where he makes greater use of experiment and observation, he appears to have passed a previous judgment on nature, and attempts to lead experience itself captive to his own opinions and his own humour: he forms a world of *categories* and *predicaments*; accounts for nature's varied operations by the scholastic distinction of *act* and *power*; asserts that there is but *one proper motion* in all bodies; and imposes numerous other fictions on mankind, which are sources of disputation rather than of truth.

*Empirical* systems are those formed upon a *few experiments only*, though these may be made with great exactness. The ancient chemists are adduced as examples, in their idle speculations on the four elements, founded on a few repeated experiments of the furnace. William Gilbert, who lived in Lord Bacon's time, and framed, as we have remarked, a system of philosophy on his experiments in magnetism, was a notable instance of this kind.

*Superstitious* systems are those in which certain philosophical theories are blended with religion, and the one is made subservient to the other. Of these the philosophies of Pythagoras and Plato are specimens; their theories being principally derived from their speculations on the nature and attributes of the Deity. Some theories of the earth in modern times may come under this denomination; and perhaps there is no more signal instance of this kind than the philosophy of Mr. Hutchinson, which we have noticed above. "This vanity," says Bacon, "of mixing things divine with things human is rather to be suppressed, as from it arise not only phantastical philosophies, but heretical religions."

In framing theories, the mind, it is observed, should be especially on its guard against two excesses, that of *dogmatism* on the one hand, and *scepticism* on the other, as these both tend to perpetuate prejudices, scarcely allowing the opportunity of their removal. Thus Aristotle, in order to cut off all occasion of doubting, invented questions,' and resolved them at his pleasure, as if he were the arbiter and final judge of nature; while Pyrrho and his followers, on the contrary, doubted of every thing, which was an abuse of the school of Plato, where the sceptic method was first introduced by way of jest and irony, to oppose the more ancient dogmatists. The former of these methods, or that of positively dogmatising, cannot but contract and degrade the mind, while the other must cast it into languishment and despair of ever finding the truth.

All these *Idols* of the mind which have now been noticed, have moreover been greatly defended and strengthened by false *proofs* and *corrupt demonstrations*. Words have been the tyrants of thoughts, and thoughts the slaves of a conceited logic, which has been associated with erroneous and hasty impressions from the senses—ill-formed notions arising from these impressions, and faulty induction, or such a method of establishing general principles, as has been the parent of all error, and the destruction of all the dignity and advancement of science. Thus it was that Gilbert limited his experimental inquiries to the loadstone; and the early chemists and their followers were



perpetually employed in the single art of *alchemy*. This word means the knowledge of the *substance*, or *composition* of any thing: and the two leading objects of the *alchemists* were, the change of the common into the precious metals, or gold and silver; and the discovery of a universal medicine—some elixir of immortality which they fondly hoped would annihilate disease, and prevent the irrevocable doom of humanity, death!

### IV. *Characteristics of false Systems.*

Lord Bacon next gives some *intimations, or signs by which false theories and systems of philosophy may be known*, so as to prevent the impositions likely to arise from them.—One is, the *origin* from which a system of philosophy is derived; which, if it be false and erroneous, whatever immediately arises from it must of course be so too. The sciences existing in the time when the *Novum Organum* was written, were almost wholly derived from the Greeks, whose philosophy, as we have seen, was chiefly of the dogmatic and disputatious kind. This was the characteristic, generally, of their several schools; the writings of the more ancient of the Greeks, who opened no schools, having been lost in the lapse of time, such as those of *Empedocles, Anaxagoras, Leucippus*, etc., who applied themselves to philosophy with greater simplicity, and with less affectation and conceit, than their successors. The *source* of the existing philosophy was, therefore, corrupt.

If any indications may be gathered from the *times* in which the ancient theories were framed, no great good, it is further argued, could be expected from these. In the ages of the Grecian philosophy, the field of observation and experience was limited by the little knowledge the ancients possessed of the habitable world. Their history, also, of past events, and of the origin of nations, was to a great degree fabulous. They considered many regions uninhabitable where great nations have been since found to exist. Their travels were extremely circumscribed, and the art of navigation was exceedingly imperfect.

If, moreover, we judge from the actual *effects* of the Grecian philosophy, very little can be shown to have resulted from it tending to improve the condition of mankind, during the space of so many ages. Something, indeed, may have accrued from the pursuit of chemistry among the ancients and their followers: but this has rather happened by accident than been produced by design; for all their theories were injurious to the discovery of truth. The cultivators of the magic arts, too, in their jugglery, have stumbled on some few matters; but even these have been corrupted by imposture. The *alchemists*, however, Lord Bacon allows, made not a few useful discoveries while vainly pursuing their chimerical and visionary projects. We are indebted to their labour and perseverance for the method of preparing alcohol, aqua-fortis, vitriolic acid, volatile alkali, gunpowder, and a variety of other chemical compounds.

Another test of truth in philosophical systems may be derived from their *progress* and improvement: but, up to the seventeenth century, that is, for two thousand years, the sciences had been nearly stationary; or rather they flourished most in the remotest ages, and afterwards declined. Witness the decay of the Pythagorean astronomy till the time of Copernicus.

Again, the *confession of the authors* themselves of the systems that had prevailed may be regarded as a testimony of the strongest kind to the vanity and inefficiency of these theories; for while these men pronounced on nature with the utmost confidence and dogmatism, we may detect them at intervals assuming a desponding air, and complaining of the obscurity and uncertainty of all things. Hence arose the school of the *Academic* philosophers, who doubted of everything, and consigned mankind to the eternal darkness of a sceptical ignorance.

The great *disagreement* and *opposition*, moreover, that existed among the ancients, shows, says Bacon, that "the avenues from sense to reason were not well guarded, since the one subject of philosophy was so rent and split into error, that nothing remained fixed and stable in the existing notions derived from the Greeks; nor was there any certain rule of investigation."

The opinion, also, that was entertained in the sixteenth century, that a *general consent* prevailed in the philosophy of Aristotle, was a *fallacious* argument of its truth; for the prevalence of the doctrines of Aristotle and Plato was greatly owing to the accidental circumstance of their being preserved from the general wreck of human learning, which ensued on the irruption of the barbarous nations into the Roman empire. Besides, such a consent as that which is supposed, if proved to be ever so little founded on accident, would better deserve the name of *obsequiousness*; not being the result of a free exercise of men's judgments, all centering at last in the same conclusion, but the offspring, as it is evident, of prejudice, and an abject vassalage to the authority of names.—The character, therefore, of the systems of science and philosophy that had been current, was extremely unfavourable to the supposition of their truth, whether taken from their *origin*, their *fruits*, their *progress*, the *confessions* of their authors, or from *general consent*.

### V. *Causes of Error in Philosophy.*

The next topic of the *Novum Organum*, and the *fifth* convenient section into which the former part of the work may be divided, relates to the *causes of error* in philosophical inquiry.

The first cause assigned by our illustrious author is, the *short space of time* which, notwithstanding the lapse of so many ages, had been at all productive in the discoveries of science. He beautifully compares duration to space, and places before us the emblem of a barren desert, as a fit representation of that lasting sterility which had reigned over the tracts of time. Scarcely six of all the centuries preceding the age in which he lived could be regarded as, in any degree, exceptions to this general winter of the human mind. The middle ages were proverbially periods of gross and palpable darkness. Men of leisure were found shut up in the gloom of monasteries; and rarely did a ray of genius emerge from these cloistered solitudes, and find its way into the theatre of human life, so as to improve and embellish it with inventions like those which have, in our happier times, rendered it a scene of ever new and increasing wonders.

Even at the best, the comparative *neglect* of the philosophy of *nature*, properly so called, may be regarded as another source of



the slumber of the human intellect, and of its inefficiency in attaining to anything like a just method of science. The sublimest geniuses, allured by gain, or by the love of speculation, exhausted their energies in the disputes of a scholastic theology; or, at a more early period, among the Romans, were almost wholly devoted to politics. Mathematical and natural science, the parents of all mental discipline, had lost the footing they had obtained among the remoter Greeks, almost from the time of *Thales*; and even the great moralist, *Socrates*, had contributed, in a considerable degree, to turn away men's minds from the contemplation of nature. Thus the most definite and tangible sources of our knowledge—those which are peculiarly adapted to fix and regulate the operations of the mind, by perpetually recalling its attention to what is seen, and felt, and heard, were abandoned; and the human imagination was suffered to roam in a shadowy and aërial region, amid a scenery that was not nature's creation, but its own.

Again, where some taste for the study of nature herself *did* exist, scarcely one single individual was found to devote himself *wholly* to this pursuit. Nature was still not sought for her own sake, but was made the handmaid of some profession; and to this she was enslaved. Nature was not regarded as the parent of the sciences; and these, by standing too much alone, resembled the branches of a tree attempted to be kept alive separated from the root and the trunk.

The *true end* of science also was *mistaken*, "which," says Bacon, "is to enrich human life with useful arts and inventions;" and philosophers had made it their chief object to be at the head of sects; to aggrandize their own fame; to gain dominion over the minds of men; or to obtain some other exclusively selfish end. Almost every kind of inferior aim was by turns the lord of the ascendant, while *truth*, immutable, unalterable truth, loved and sought for its own sake, was eclipsed, or cast into the shade.

Besides, had the end itself been right, yet the *method was wrong*. As this is the main drift of the first part of the *Novum Organum*, we can scarcely insist on it too much, since nothing is more important here than to remember, that so long as any gross impropriety exists in the *manner* of investigating truth, the most strenuous labour must be in vain. All things were left, as it is strongly expressed, "to the darkness of tradition; the giddy agitation and whirlwind of argument; the waves and windings of accident; and a vague, uninformed experience." The first inquiry had always been, to know what others had said and thought on the given subject. This was usually received, and to it were added the vagaries of the inquirer himself. Such a method could, of course, only propagate and perpetuate error; and in such a state of things truth still remained shut up as in a labyrinth.

*The blind reverence for antiquity*, also, which had possessed the minds of men, and the devotedness which existed to great names, well accorded with the feeble efforts of the human intellect, and formed a striking feature in the reign of darkness. The assertion of a philosopher was almost the only specific against error, and the chief support of truth: whereas, observes Lord Bacon, "truth is justly to be called the daughter, not of authority, but of time;" in other words, time and patience alone can furnish the opportunity of that observation and experiment on which knowledge must be legitimately founded. The argument

addressed to human modesty, as the logicians termed it, was, however, often received with a kind of religious awe, even when the proposition affirmed, if, indeed, understood at all, was revolting to common sense. It certainly ought to be no subject of complaint, that this is the peculiar delinquency of the age in which we live. Even the overpowering genius of Newton has not preserved his theory from opposition in very recent times—an opposition, nevertheless, only to be viewed as the result of that most desirable freedom of inquiry, which was almost unknown to the ancients, and which can, at no period, issue in anything but the additional, or, we might say, the superfluous, confirmation of the Newtonian philosophy. To believe without examination, however it may accord with our natural indolence, is unworthy of the mind of man. In such an assent, its noblest powers are more than dormant and useless: they contract, if we may so say, by every such repetition of what is not worthy to be called *belief*, a sort of rust and stiffness, that unfits them entirely for all original and unbiassed inquiry, and which ends only in rivetting the chains of ignorance and error.

Similar in its effect to the admiration of great names, is the *tendency to be dazzled* with whatever rises, in the least degree, above the ordinary level in the productions of the human mind. Too much satisfaction and complacency in what has already been attained may have the effect of obstructing further progress. This, Lord Bacon observes, has particularly shown itself in the inventions of the mechanic arts. We are, perhaps, more ready to rest in an empty admiration of what has been effected, and to amuse ourselves with the apparent opulence of human power, than to reflect on the little progress that has been made in bringing matter under our control, and to consider the vast field that still lies open before us. After all, in mechanical instruments the ultimate principle is very *simple*—all may be reduced to a few laws of nature. In a clock, for instance, which seems, in one view, to imitate the movements of the heavenly bodies, and in another, to resemble the pulsations of animals, by its regular and successive motions, a few principles only are ultimately employed, as the law of pendulums, depending chiefly on gravitation. With what sentiments, however, would the ancients have looked on such an invention as the steam-engine, in which, nevertheless, the whole of the novelty, strictly speaking, lies in the application of the expansive power of steam! The causes of retardation in the improvement of knowledge, dwelt on in this part of Lord Bacon's work, have certainly been counteracted, in our time, by that rapid succession of inventions which has marked the increase of the sciences, though, in other respects, there would be much more to foster the complacent admiration he speaks of.

Another considerable cause of error and ignorance to the world, is placed, by this most accurate observer, in the *pedantry* of philosophers themselves, who have contrived to impose on mankind by their pompous airs, and affected manner of teaching—by the trickery of a meretricious and bombastic oratory, and by the subtil divisions and definitions they have employed; so as to inspire the vulgar with a profound idea of their wisdom, and to leave the impression that the sciences were exhausted by their learned labours, and nothing remained now to be investigated. No doubt this has, in every age, been a fertile source of obstruction to human improvement. The most dignified, and even sacred



professions have been too often degraded by a conceit and a quackery which, while it has disgusted the discerning, as the subterfuge of incompetent effrontery, and has proved an injurious bar to the exertions of modest and genuine merit, and to the progress of pure truth, has not failed to gain its own selfish ends, in the plaudits of an ignorant multitude. The only cure for this evil is the general diffusion of knowledge among all classes of society, which is, most happily, a leading feature of the present illustrious times.

The ancient and erroneous systems of philosophy obtained an additional hold on the public mind, also, in consequence of the *vanity* and the extravagant *pretensions* of not a few individuals of more modern date. Lord Bacon had to encounter this disadvantage in the very enunciation of many of the topics of inquiry to which he desired to recal the attention of the world in a just and scientific method: we allude to his notices for increasing men's acquaintance with the mineral kingdom; for obtaining more information with regard to the winds and the weather; the means of prolonging human life, and other inquiries. He complains of the weakness and imposture of many who had amused the credulity of mankind with great promises, in reference to such topics as the retardation of old age—the relief of pain—cures for the deceptions of the senses—the method of exciting the affections by sympathy, or a species of animal magnetism—the exaltation of the intellectual faculties—the transmutation of substances, as professed by the alchemists—the procuring of celestial influences—divination of future events—the revealing of secrets—and other such like conjuring. Thus, as real history may sometimes have suffered in its credit from fiction, and there are some who would consign the conquests of Julius Cæsar to the same scale of probability with the fabled exploits of Arthur of Britain, or Amadis de Gaul, so the spirit for great designs has been quenched by the dread of what might prove chimerical and romantic, and men have been contented to repose in the solemn and received dogmas of antiquity.

"So great, moreover," adds Lord Bacon, "has been the pusillanimity and indolence of men, that they have been wont to satisfy themselves with *very slender performances*;" often exalting, with the title of new mechanical inventions, what were, in fact, nothing more than some trifling modifications of old ones—this has been another barrier, he considers, to the advancement of the sciences.

But one of the most formidable obstacles to the genuine knowledge of nature is to be found in the *superstition* which has mingled itself with the great and momentous subject of religion. We learn from Aristophanes, in his play of "*The Clouds*," that among the Greeks, those who first attempted to assign the natural causes of thunder and storms were condemned as the enemies of the gods. Nor did some of the early Christian Fathers, as our author remarks, meet with much less severe anathemas for daring to assert, on the evidence of infallible proof, the spherical figure of the earth, and the existence of *antipodes*, or people at the other side of the globe, whose feet are opposite to ours. It is known to most of our readers that Galileo, the inventor of the telescope, was consigned to the dungeons of the inquisition at Rome, for the crime of asserting the motion of the earth round its own axis, and was con-

demned to do penance, by repeating once a week the seven penitential psalms for the space of three years!—The blending of the scholastic and Aristotelian philosophy with religion, in the middle ages, was a fruitful source of this kind.

Lord Bacon's remarks on this subject are so just, and so important, that we shall quote him at length. "As things now are," he says, "it is still more difficult and dangerous to discourse on nature, on account of the summaries and methods of the scholastic divines, who have, with all their might, reduced theology to order, and fashioned it into an art; and have, moreover, blended too much of the disputatious and thorny philosophy of Aristotle into the body of religion. And to this subject, though in a different respect, belong the labours of those who have ventured to deduce and confirm the truth of Christianity from the principles and authority of philosophers; celebrating with great pomp and solemnity the intermarriage of faith and sense, as a lawful union, and soothing the minds of men with a grateful variety of matter, while at the same time they have rashly and incongruously mingled things divine with human. In such medleys, moreover, of divinity and philosophy, only those things are admitted which are *now* received in philosophy, whilst things that are new, though better than the old, are almost entirely excluded. In fine, we perceive, that through the ignorance of certain divines, the passage to any philosophy, though ever so true, is almost blocked up. For some are foolishly alarmed lest a deeper inquiry into nature should transgress the bounds of sobriety; and they injudiciously wrest what is said in Scripture against those who pry into divine secrets, and apply it to the hidden things of nature, which are nowhere forbidden. Others, with greater craft, imagine, that if men are kept in ignorance, all things may be the more easily managed by dexterity of hand, and the *divining rod*, which they think is highly serviceable to religion: this, however, is nothing else than to aim at pleasing God by a lie! Others, again, dread the effect of example, lest any changes and movements in philosophy should fall at last on religion itself. Others are afraid lest, in the inquiry into nature, something should be found which may overturn religion, or at least undermine it, especially among the ignorant. These two latter kinds of fear appear to me altogether to savour of a grovelling wisdom; as though men, in their secret thoughts, were doubtful and distrustful of the stability of religion, and of the power of faith over the senses, and on this account apprehend danger to it from the search after truth in natural things. But whoever considers aright will acknowledge, that, next to the word of God, the most certain cure of superstition, and the best aliment of faith, is the knowledge of nature. Therefore philosophy is given to religion as her most faithful handmaid; the one manifesting the will, the other the power, of God: nor did he mistake who said, 'Ye err, not knowing the Scriptures, and the power of God,' thus inseparably blending and joining together the knowledge of his will, and the contemplation of his power. In the mean time, it is less to be wondered at that the increase of natural knowledge has been restrained, when religion, through the ignorance and incautious zeal of some, has been set in opposition to it."

The *customs of learned societies* had also, up to the time of Lord Bacon, proved a serious hindrance to the advancement of knowledge.



In the schools and universities of Europe, scarcely any room was given for improvement, which was branded with the invidious name of innovation, an alarm that could not but prove fatal to the interests of pure truth. If any one dared to exercise the right of judging for himself, he could hope for no encouragement from others; and if he possessed sufficient independence of mind to stand alone, he must pay for his temerity with the loss of his fortune and his good name. All was rigidly confined within certain rules, and a given track was marked out as that in which every one must go without deviating either to the right or left. Little scope was afforded to the power of genius, which could hardly expand upwards beneath the overwhelming load of scholastic prejudice that weighed it down. Perhaps even in our own enlightened age, few of the universities of Europe are entirely emancipated from these shackles, as may be seen from the tendency there has always been to adhere to an *Aristotelian division* of the sciences, instead of following nature. "Unwilling as I am," says Mr. Stewart, at the close of his second volume on *The Philosophy of the Human Mind*, "to touch on a topic so hopeless as that of academical reform, I cannot dismiss this subject without remarking as a *fact*, which at some future period will figure in literary history, that two hundred years after the date of Bacon's philosophical works, the antiquated volume of study, originally prescribed in times of scholastic barbarism, should in so many universities be still suffered to stand in the way of improvements, recommended at once by the present state of the sciences, and by the order which nature follows in developing the intellectual faculties."

Lord Bacon also complains that in his time arduous endeavours at improvement were *not rewarded*. The power of advancing knowledge must proceed from the energies and exertions of superior minds, but the rewards which sweeten labour were in the hands of the vulgar and untutored. Even the boon of praise was, he observes, withheld, since the flights of elevated minds are above the reach of the crowd, and are disregarded through the force of prevailing prejudices.

Finally, science was kept in bondage by a kind of sullen *despair of success*, and the supposition of impossibility attaching to any new endeavours.—Such are the causes assigned in the *Novum Organum* as the principal sources of continued error and uncertainty in the pursuits of knowledge and science.

VI. *Grounds of hope regarding the Advancement of Science.*

In that division of the work which we may call the *sixth* section, our author proceeds to treat of the *grounds of hope* for the further advancement of the sciences, and the general improvement of knowledge. Thus the *improvement in navigation* was to be regarded as the harbinger of good to the sciences, as enlarging the field of observation, and tending to increase our knowledge of nature.

The very *errors of past times* likewise, properly viewed, furnished a hope of amendment. Demosthenes endeavoured to rouse the Athenians from despondency to arm themselves manfully against Philip, their great enemy, by telling them that even their past misfortunes should be re-

garded as an omen of their future success, since they arose from their own negligence; whereas, if they had strenuously exerted themselves, and had still been unsuccessful, they might justly have despaired of the future: so, in the sciences, it would have been presumptuous to expect any great improvement, if we could have supposed mankind to have travelled so long in the proper road to truth without reaching it; but as they had evidently mistaken the way, hope of future success must be sought in first returning to the right path. The true method of science is ingeniously compared to the economy of the bee, which first gathers matter from the fields and gardens, and then digests and prepares it for use by her own native powers: "so," Lord Bacon observes, "the matter of philosophy must be carefully collected from nature, and then, after being digested and elaborated in the understanding, must be treasured up in the memory," in other words, additional hope of advancement in the sciences is to be found in the union of things that had been disjoined; that is, a strict *combination of experience with calculation and reasoning*. In all the schools of Greece, natural philosophy was blended with some foreign admixture, and was never studied purely and by itself. The Aristotelians corrupted it with a perversion of logic; the school of Plato mixed it up with an imaginative theology; the second school of Plato, Proclus, and others, made it to arise out of mathematics; whereas it is justly remarked that mathematics ought "not to generate or create natural philosophy, but only to terminate and perfect it;" that is, the facts and laws of nature must be sought independently, or in Nature herself—then mathematical reasoning may be applied to estimate and measure them, as has been exemplified in several of the tracts already before our readers. A return to the study of natural philosophy in a *pure and separate form*, was another source, therefore, of hope.

So also it might be expected that in future *some philosopher* might arise of sufficient independence of mind and lofty genius to free himself and the world from all the old and hackneyed theories: such a person, it is lamented, had not then appeared. How prophetic this was of the immortal Newton, who burst upon the world almost immediately after the death of Bacon, his forerunner—and how completely he emerged from the rude and undigested chaos of ancient fables into the light of truth, as those very comets whose laws he laid down issue from the dark abysses of space to their perihelion, the reader is sufficiently aware.

Much, very much, is also augured, as likely to arise from a better *history of nature* than had as yet been collected. The accounts which had been extant of the appearances and facts in nature had been chiefly founded on popular reports, indolent observations, and often on mere idle tales; and the whole had been so framed and turned as to strengthen the existing opinions in philosophy. Almost every thing in the history of nature was undefined and vague; much good must, therefore, needs have been expected to accrue from a more accurate register of facts and experiments. Bacon exhibits a rough sketch of such a history of nature in his *Sylva Sylvarum*, in his *Tables*, and in other parts of his works; the merits and defects of which we shall have occasion to notice hereafter.

Similar advantage was to be anticipated from a more enlarged stock



of *mechanical experience*, and a more enlightened attention to the most instructive facts of this kind. The workman is apt to think only of what is useful to his immediate work, and is not concerned about the discovery of truth: but, in order to improvement, recourse must be had to experiments, which, though useless, perhaps, as to direct and immediate profit, may be of great importance as to general information.

To this larger and more accurate stock of experience, Lord Bacon again insists, must be added the *method of induction*; or, as before explained, the pursuit of knowledge by reasoning from particulars to generals, from which every thing is to be hoped. In order to render this method as efficient as possible, it is strongly recommended accurately to commit to writing all the materials of philosophy, that is, the facts and observations on which general principles are to be founded; by no means trusting them, as had too often been done, to the memory, whose defects were usually supplied by a fanciful invention. To give this method still greater perfection, it is remarked that *tables* should be used for the clear arrangement of the facts, according to the nature of the subject; and from these tables *axioms*, or general principles, should be carefully formed, gradually rising from the less to the more general. It must be acknowledged, indeed, that many discoveries had been made accidentally by the alchemists, while seeking to make silver and gold; yet it is evident that more is to be expected in inventions from industry and method, whether we consider the number of such discoveries, the saving of time, or the adaptation of the things discovered to the supply of our wants. Men are more likely to find what they are carefully and intelligently in search of, than what is left merely to the operation of blind chance.

It was to be regarded as an additional ground of hope that *some things* already discovered were such as had previously never entered the mind of man; or which would, in all probability, have been despised as impossibilities, if any one had declared them likely to be found out. Gunpowder, though a destructive invention truly, may be taken as an instance. If, before this discovery had been made public, it had been declared that there was a method of battering down walls, and making an impression on the strongest fortifications at great distances, those who heard of it would instantly have supposed that this was effected by increasing the power of the common engines of war that were previously in use, as battering rams, and other machines of the same kind; which, of course, must be done by means of additional weights, wheels, and levers, and the various combinations of the mechanical powers; "but no one," says Bacon, "would have thought of a fiery wind which should blow with such a prodigious expansive violence, no obvious examples of such effects having been previously seen, except in the sublimer operations of nature, storms, thunder, and earthquakes, which it would not be supposed were imitable by art." Perhaps, to the ancients the expansive force of steam, now so extensively employed, would scarcely have appeared less wonderful, which, while it possesses such amazing power as to produce the most terrible effects when allowed to explode by being confined, is yet capable of being regulated at pleasure, and directed to an immense number of useful works with the greatest advantage. The invention of silk is mentioned as

another example. So, likewise, if, previously to the invention of the compass, it had been said that a certain instrument should be made known which in the open sea, and in the dead of night, when neither stars nor moon appeared, would exactly point out the quarters of the heavens, and that this instrument was nothing more than a metallic substance, which might easily be overlooked among the similar productions of the earth, this would have seemed almost incredible. Whence it is argued that many other things may yet remain in nature that might be of great service to mankind, which have little relation or analogy to the things already discovered.

Again, on the other hand, there are inventions of such a kind as easily to be *overlooked* for want of method, though they may almost, so to speak, stare men in the face. While some things, as gunpowder, silk, the compass, sugar, paper, may seem to depend on certain properties to be developed by Nature herself, yet other things, the art of printing, for instance, contains nothing that is not obvious and completely within human power; nevertheless, the world was for many ages destitute of this admirable invention, which is so intimately connected with the propagation of knowledge. Hence a ground of hope that science might be improved was to be drawn, not merely from the consideration of the unknown operations of nature hereafter to be discovered, but from the probable result of transferring, compounding, and variously applying those laws and operations which were already known.

Lord Bacon also derived encouragement from reflecting on the immense expenditure of time, genius, and property that had been bestowed on *pursuits of little or no use*, alluding, probably, to alchemy, the professed magic arts, astrology, etc.; since, if but a small portion of this labour should come to be bestowed in a proper manner, and on proper objects, great things might be expected to result: especially would such extensive and laborious *histories* of the *facts* and *operations* of nature as he recommended be the source of expectation. "A great and royal work truly this," he says, "and of much labour and expense."

As a further ground to suppose that human knowledge might be improved and increased to an extent of which some were inclined to despair, Lord Bacon introduces *his own example*, "not," he modestly says, "by way of ostentation, but because it may be useful." He argues, that if he himself—a man as much employed in civil affairs as any other of the age in which he lived, for he was Lord Chancellor of England at the time his *Novum Organum* was published;—if he, a man of but infirm health, has had the honour to lead the way unassisted by any coadjutor, in the new and untrodden path which he here attempts to point out to posterity; what may not be expected from men of leisure; from a union of labours; from a proper division of them, and from opportunities afforded by the succession of ages? He concludes his remarks on the grounds on which is founded the hope of advancing the sciences, by intimating that even were this expectation much less than he rightly deemed it to be, or, to use his own language, "although a much weaker and fainter breeze of hope should breathe from *this new continent*," or world of science, which he is endeavouring to point out;



yet it would be worth men's while, at all events, to make efforts to explore nature by the light of this new method: there was, at least, *a chance* of success resulting from their labour; whereas, to sit down in despondency, and to decline all enlightened exertions, could lead to nothing but ignorance and error, and was unworthy of the dignity of the human mind.

VII. *Further Remarks preparatory to the Inductive Method.*

The last or seventh section into which this former part of the Novum Organum may be divided, is designed to give *some further idea of the new method here proposed of interpreting nature.* This, however, is done rather by way of guarding the reader against erroneous expectations than by developing the method itself which he reserves for the second part. "Having now levelled and polished the mirror," says our author in his figurative and expressive diction, "it remains that we set it in a right position, or, as it were, with a benevolent aspect towards the things we shall further propose. For to a new undertaking, not only a prepossession in favour of a rooted opinion is prejudicial, but a false notion and imagination of what is proposed to be done is equally so. We must, therefore, endeavour to convey a just and true idea of what we intend."

In order to prevent misapprehension, he again cautions his readers, as he had done at the outset of his work, against supposing that he aspired to be the founder of a *new sect* in philosophy, after the manner of the ancient Greeks. It was his aim, and it was an aim worthy of such a master-spirit, not to reign over men's opinions, but to conduct them into the temple of truth, from whose inmost sanctuaries they might obtain such a panoply as would enable them to extend the boundaries of man's power over nature, not in the noisy triumphs of a scholastic warfare; but in glorious victories over ignorance, prejudice, and error. Though he thus disclaims the idea of attempting to found a new sect, it must be allowed that he possesses that honour in the highest sense; for if we were, in the most general manner, to designate the philosophers of modern times, in contradistinction to the Aristotelians and Platonists of an earlier period, we should call them *Baconians*: Bacon may himself very justly be accounted the Father of the modern philosophy. He, however, contents himself here with aspiring, as he says, "only to sow the seeds of pure truth for posterity, and not to be wanting in his assistance to the first beginning of great undertakings."

Lord Bacon wishes his readers, in perusing his work, not to be prejudiced against the method he recommends, nor disappointed on finding that he has not made any very striking *discoveries*, which, indeed, he does not profess to have done; his design, in fact, being obviously of a more general nature. For though in the *Novum Organum*, and in his other works, indications and outlines of discovery are to be found, yet he considered that, up to his time, there was no sufficient collection of facts and appearances, to enable any one to enter with advantage on the genuine interpretation of nature. Still he did not wish to discourage any from employing their sagacity in attempting to make discoveries on the foundation of what was already known, or

from making use of his own tables and outlines of a history of nature, to this end; but his own great object, he repeats, was to prepare the way for future improvements, and not to neglect this his main design, for the sake of hasty and unseasonable diversions, like "Atalanta" in the fable, who lost the race by stopping to pick up the golden apple. "For we do not childishly affect golden fruit, but place every thing in the victory of art over nature."

He next cautions the reader against the effect which may be produced on his mind from meeting with some experiments in the *history* of nature, and *tables* of invention, which seem *not* well *verified*, or which may even be absolutely *false*. Such errors are to be expected to creep in at the dawn of the day of Science, and Lord Bacon was certainly by no means free from them. It must not, on account of a few such oversights, be suspected that the inventions he would point out are grounded on doubtful principles and erroneous foundations; and he argues that if any should be disgusted with some particular mistakes in his account of facts in nature, what must be thought of the remiss and negligent method that had hitherto been employed, and what of the philosophy and of the sciences that were built upon such "quicksands?"

Nor are men to turn away from the inductive method, or from the experiments it demands, as if in some cases it dwelt too much on what might seem *minute*, or *trite* and *vulgar*; since great mischief has arisen from many things having been spoken of as known and ascertained, of which, in fact, little was understood. Thus, in the philosophy that was prevalent, *gravity*, the *celestial motions*, *heat*, *cold*, *hardness*, *fluidity*, *density*, *animation*, *similarity*, *organisation*, were all the subjects of dogmatic assertion, while little that was satisfactory was said respecting them. Men, however, must condescend to attend to the commonest things if they would acquire knowledge, and to things displeasing to the senses. The design here is "not," he says, "to build a capital or erect a pyramid to the glory of man, but to found the temple of the universe in the human intellect." None are to suppose, what the vulgar are too ready to imagine, as well as all who were devoted to the existing philosophy, that the minutiæ here laid down are tedious and subtil; they ought rather to consider that, for a time, efforts should be made to increase the materials of knowledge, to kindle the light by which nature may be examined, and that a too great impatience for immediate advantage should be checked. If any one should be inclined to disregard the cautions, principles, and axioms laid down in the method of induction, as needless subtilties, what would he say to the schoolmen, who are full of subtilties, 'without end as without fruit?'

As an apology for what to many would appear a *bold* and *daring* attempt—that of rejecting all the sciences, and all the ancient masters in philosophy as with one stroke, without admitting the authority of any one single renowned name of antiquity, and trusting only to his own unaided strength—the author remarks that, were he disposed to act insincerely, it would not be difficult to persuade men that what he here attempts is but a revival of the most ancient method of Science, before nature was pompously ushered in with the "flutes and trumpets of the Greeks;" and, well acquainted as Lord Bacon was with the mythology of the ancients, it would have been easier perhaps for him



to have gained over the admirers of antiquity by this expedient, than to render palatable a system which presented no gaudy and alluring theories, and which came out entirely as a modern innovation. But with that astonishing degree of freedom from the shackles of prejudice, considering the time in which he lived, and that devotedness to natural truth for its own sake, which was so characteristic of this great philosopher, he disdains all such "stratagem and imposture," and relies exclusively on the evidence of things themselves. It is his object to place before the mind, not the mock models of the world which others had framed, of which the theories of Aristotle, Plato, and Epicurus, are specimens, but to present the world's true model as it exists in nature—to trace before the eyes of men the exact lines of truth.

Another objection, which it is supposed may be alleged, is, that, notwithstanding all the labour here employed to impress on mankind this new method of studying the Sciences, it will probably do no more than land us at length in *some one of those systems* of philosophy which prevailed among the ancients—that they, in the beginning of their investigations, procured a large stock of observations and experiments, and digested them into books and tables, as is here recommended, and from these sources extracted the matter of their theories: but thinking it needless to publish their notes and minute observations, those materials of their labours are now lost to us,—as architects, after a building is finished, take down the scaffolding and framework, and remove them out of sight. To this it is answered, that though it is difficult to suppose the ancients completed their works without some such collection of materials, yet, at all events, it is certain, from their writings, that their method of philosophizing was no other than flying hastily from some particular examples, to general conclusions; and if any new examples occurred, bearing an aspect hostile to their favourite ideas, they either contrived to make them seem to square with these, or else struck them out as exceptions, thus sacrificing every thing to their beloved theories. Now the very method here insisted on, Bacon argues, of rigidly adhering only to those principles which are common to all the particulars and examples, precludes the possibility of arriving at the same results with the ancients.

Nor can it be fairly charged upon this method of carefully attending to all the facts of the case before drawing the conclusion, that it leads to *scepticism*, since it is not the disposition to doubt, but the art of *doubting properly*, that is alone inculcated; and it is preferable to know something in a certain manner without supposing we know all, than to think we know all, and yet remain in actual ignorance of that which is most necessary to be known.

Lest it should be supposed, moreover, that the proposed plan only extended to the improvement of *natural* philosophy, more properly so called, he distinctly informs his readers that his design is of the most general kind possible. The method of induction is equally useful in all the sciences. It is alike applicable to *ethics*, *politics*, the *philosophy* of the *human mind*, *chemistry*, *botany*, and every other branch of knowledge.

As a further stimulus to a vigorous pursuit of science in this enlightened method, this first part of the *Novum Organum* closes with a

few additional reflections. It is urged that the discovery of *truth*, and noble inventions, holds the most *excellent* place among the actions of mankind. Antiquity, with all its errors, was perfectly alive to this sentiment, as is sufficiently evident by its attributing *divine* honours to the inventors of the arts, as to Prometheus, who is represented as being the giver of fire to mortals, and is celebrated in Æschylus as a deity—while it was usual to award *heroic* honours chiefly, to mere legislators and the founders of empires. The inventions of science, it is observed, "benefit mankind to the end of time; while the advantages conferred by warriors and statesmen may last, in many cases, but for a few ages, and sometimes have their origin in tumults, and the most terrible desolations of war." The effects of the invention of printing and of the mariner's compass, for example, have been altogether prodigious: by these great instruments, navigation and commerce have been extended over the whole earth; "divine and human learning," to use the words of Milton, "have been raked out of the embers of forgotten tongues," and the face of the world has been changed, in all its features, physical and moral.

The design of promoting the advancement of the sciences is further pronounced a far *nobler* object of *ambition* than either *private* aggrandizement, or even *patriotism* itself. "The first," says Lord Bacon, "is vulgar and degenerate; the second, that is, the ambition of those who endeavour to raise their own country in the scale of nations, is more noble, but has not less of cupidity: but if any one should labour to restore and enlarge the power and dominion of the whole race of man over the universe of things—this kind of ambition, if so we may call it, is without doubt more wise and dignified than the rest. Now this power of man over things is entirely founded in arts and sciences."

"Finally," adds this illustrious author, "should any one object that the arts and sciences may be abused to *evil* purposes, as luxury and wickedness, let this sentiment be allowed to have no weight. The same objection would equally apply to all the most excellent things in the world—as genius, courage, strength, beauty, riches, and even light itself. Let the human race regain their dominion over nature, which belongs to them by the bounty of their Maker, and right reason and sound religion will direct the use."

Thus did this vast genius point out to mankind the causes of those errors which so long effectually obstructed the paths of science; thus did he encourage them to hope for a brighter æra, and give directions for the more successful pursuit, in future, of knowledge and truth. The second part of the *Novum Organum* contains a further developement of the principles of the *Inductive Method*, with the author's own examples of its use: and it will form the subject of another Treatise.

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Toledo, named Ben-Albalid Albinsi, who wrote about the thirteenth century, then recommended the affusion of cold water as an efficacious remedy in adynamic fever, and hence anticipated Dr. Currie by 650 years at the least.

In conclusion, we would now state that not only fever, but other diseases have frequently prevailed epidemically throughout the Spanish peninsula during former and recent periods. For instance, diphtheria, which has lately attracted considerable attention, was common many ages past in Spain, the name it acquired being "Garotillo," "Morbus suffocemo," or "Esquinancias gangrenosas," and was said by medical authors to have been originally propagated from Astracan through Europe. The disease prevailed extensively both in Italy and Spain during 1530, as also in the latter country about 1596, having commenced at Granada, from whence it spread over the peninsula, and proved then very fatal everywhere. Early in the seventeenth century the complaint again became epidemic, particularly at Madrid and adjacent provinces; while in 1613 it was so rife and mortal in many districts of the country, that this year was designated historically, "El año de los Garotillos." Besides other epidemic visitations, whether fever, garotillo, or maladies which have been often noticed during more recent periods, cholera has also prevailed several times in Spain since its recent appearance in other parts of Europe. Among places which have lately suffered from this scourge, and where its victims were numerous, Valencia, Murcia, and Malaga, may be specially mentioned. Indeed, only last summer the city last named became severely attacked by cholera, which in a brief period caused the death of thousands, among whom may be recorded a distinguished English physician and member of Parliament, who was visiting Malaga at that unhealthy season.

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## Review III.

1. *Toynbee on Diseases of the Ear.—London*, 1860. pp. 422.
2. *Die Anatomie des Ohres.* Von Dr. A. F. von Tröltsch.—*Würzburg*, 1861. pp. 105.

*The Anatomy of the Ear.* By Dr. A. F. von Tröltsch.

3. *Wilde's Aural Surgery.—London and Dublin*, 1853. pp. 496.
4. *Die Ohrenheilkunde in den Jahren* 1851–1855. Ein Nachtrag zu der Erkenntniss und Heilung der Ohrenkrankheiten von Dr. Wilhelm Kramer, Königl. Preuss. Sanitätsrathe.—*Berlin*, 1856. pp. 136.

*Aural Surgery in the Years* 1851–5. By Dr. W. Kramer.

5. *Taubstummheit, Ohr- und Gehoerkrankheiten.* Von F. L. Meissner. —*Leipzig and Heidelberg.* 1856. pp. 387.

*Dumbness, Diseases of the Ears and Hearing.* By F. L. Meissner.

Nearly two hundred years have elapsed since Heurnius Mercurialis published his prelections 'De Oculorum et Aurium Affectionibus,' and

yet in two English works, whose titles head this chapter, we find the authors remarking how readily medical men affirm "that they know nothing about diseases of the organ of hearing."

This is but too easily explained by the fact that, except in one or two medical schools, no special attention is given to the subject; true, the anatomist lectures on the structure of the ear, but the student finds it almost impossible to reconcile his chipped and incomprehensible dissection of the "petrous portion of the temporal" with a teacher's descriptions and diagrams. An examiner who, five years ago, would have inquired very minutely into a candidate's knowledge of the ear would have been considered as little better than a Herod, and his questions would probably have been followed by a massacre of innocent hopes terrible to contemplate.

Yet why should this be? how much of human happiness depends on the integrity of what is contained in that little nut of hardest bone; to the child, whether he is not only to hear but speak; to the adult, whether he is to pass through busy life with "the exciting scene silent as a picture;" to the aged, whether the last years of life are to be deprived of rational enjoyment.

While we cannot deny the truth of Messrs. Toynbee and Wilde's somewhat humiliating statement, we at the same time feel grateful to them for it, and to all others who have endeavoured to bring this important class of maladies under the control of man.

Classifying aural diseases is not such an easy task as would appear at first sight. A simple anatomical arrangement suggests itself to every educated surgeon, and such an one was adopted by Du Verney and Mr. Wharton Jones; but, as Mr. Wilde observes, "as it is not possible to limit disease, especially of an inflammatory character, to any particular structure, so is it impossible to carry the anatomical division beyond a certain extent." Nevertheless, though he pays Lincke the high compliment of considering him "the best modern classifier," he adopts the anatomical method as far as he can. Lincke's classification may be shortly stated as a division into

I. Inflammations, simple and specific.
II. Affections caused by solution of continuity.
III. Affections caused by cohesion of parts.

Mr. Toynbee follows the anatomical method, beginning with the auricle. This appendage probably serves to collect the sonorous vibrations, and though not an essential, must surely be considered an important part of the auditory apparatus. Nevertheless many, as Itard, say it is of little or no use; and Richerand says it "may be removed without injury further than a little hardness of hearing for the first day or two." On similar evidence it would be no less strange to affirm that the external auditory meatus is of no use, because we every now and then meet with cases where the external ear is imperforate, and yet a considerable amount of hearing power remains. The writer knows of a girl who does the duties of housemaid in a public institution, and has a very useful amount of hearing, without either auricles or apparent meatus, and yet he would hardly affirm that the ear-hole would not be an important addition to her hearing apparatus.



The auricle is co-heir with other parts of the body to many ills of the flesh, and in addition has been subjected to maltreatment from the earliest ages. The Hebrew bondsman who declined to leave his master when his years of servitude had expired, had "an awl thrust through his ear unto the door, and he shall be thy servant for ever: and also unto thy maid servant shalt thou do likewise." This would probably serve the double purpose of testing the sincerity of his wish to stay and marking the owner's property. The elegant vestige of barbarism, the wearing of earrings, is occasionally followed by keloïd growths of the lobule. Mr. Wilde figures an ear with a tumour between the helix and concha, which he says felt like a hydrocele, and was full of a glairy fluid, resembling the contents of a ranula or enlarged bursa, contained in a smooth polished sac. This author states that "Morbid growths are by no means uncommon; steatomatous and sebaceous bodies form on the concha," and thus differs from Mr. Toynbee, who says that the "*only* encysted tumour found on the auricle is a collection of blood between the cartilage and the skin," which was thought at one time to be peculiar to the insane, and on the origin of which Dr. Thurnam seems to throw considerable light by the remark that it is less common now than in the days when insane patients were more harshly dealt with. Indeed, one is somewhat inclined to class it with the cases Mr. Wilde alludes to as having been common in the days of faction fights in Ireland, where the morbid appearances might be traced to "blackthorn sticks."

Cancer fixes its steady gripe upon the auricle, though fortunately, as Walshe remarks, it is rarely the seat of primary disease, though it may spread from the cheek or lip. Nor do records exist showing in what manner the affection originates, when primary in this situation. Dr. Kramer describes the early stages of scirrhous degeneration of the auricle as similar to those of erysipelas. In the case operated upon by Dr. Fischer, the patient suffered when eight years old, and the disease gradually progressed till he was twenty.

So far, aural diseases are simple enough, but as we pass further in, they become more complicated, and the student soon finds that unless he is familiar with its anatomy, he is like one entering a new country, with but a few partially understood names to guide him through dark and winding ways.

No further than a line or two from the orifice are the ceruminous glands secreting a band of wax "half an inch in length and half a line thick," of such consistence as will enable it to retain its position and catch the particles of dust which are floating in the atmosphere. Slowly secreted in health, it is gradually expelled by the motions of the lower jaw. But sometimes these minute glands strive to imitate the vices of their betters, and secrete too much or too little, or not at all, or what they secrete may be too soft or too hard. Liquid cerumen runs incontinently from the ear, but hard wax remains in the meatus, and more and more accumulates; the person endeavours to remove it, and

only drives it further in, with additions of hair or epithelial scales, which serve, like the straw in the Israelitish bricks, to insure the cohesion of the mass.

This pellet of wax may now be compared to an opaque lens in the eye: no light can get through the one, no sound through the other, and none past it, should the dermis be tumefied. Not only will it now cause deafness, but by pressure it may excite absorption of the bony walls of the ear-passage, and by forcing the membrana tympani inwards, induce the peculiar cerebral symptoms supposed to be caused by undue pressure of the stapes against the contents of the labyrinth. One would imagine that nothing could be easier than to remove this mass of wax, and perhaps ordinary surgeons may think so. Mr. Wilde recommends a spatula or forceps for the purpose, thinking "the mere projection of warm water from a syringe" scarcely efficient by itself; whereas Mr. Toynbee says "the only judicious mode" is by the use of the syringe. When it is very hard, both these gentlemen advise softening it with oil or an alkaline solution. To be sure it may be merely an instance of the universal ignorance of aural surgery which these writers deplore, but we somewhat dislike this dogmatizing upon manœuvres which must be simple enough, even in the most (comparatively) complicated cases. We all know that one man can extemporize an instrument which he will make do what he pleases, while another may be too awkward even to use a stream of water with impunity to his patient. It is safer to be cut for a strangulated hernia by one man, than to have the bowel returned by the taxis of another. Specialists, as they are called, should be especially careful to avoid the

> "Turgid style,
> That gives an inch th' importance of a mile;
> Casts of manure a wagon load around,
> To raise a simple daisy from the ground;
> Creates a whirlwind from the earth to draw
> A goose's feather;"

or even a "large compact mass of cerumen" from the ear.

At the same time, we quite agree with the authors in considering it occasionally very difficult to remove small round foreign bodies from the meatus. And it is scarcely possible to attach too much importance to discharges from the ear, for they are but too commonly followed by what Mr. Wilde calls "that disgusting disease, otorrhœa;" or the inflammation becomes periosteal, and spreading to neighbouring structures, produces fatal consequences: in fact, so prone is this diffusion to occur, that Mr. Wilde confesses to being forced away by it from the anatomical system of classification. Indeed, the violent pain and fever accompanying inflammatory attacks of the meatus and outer layer of the membrana tympani, so frequently followed by rupture of the latter, show, in his opinion, that the mucous membrane on both sides of the membranous diaphragm which separates the two portions of the auditory meatus is generally involved.

Allowing for the differences which exist between cases, it would seem that for the acute inflammatory attacks purgation, fomentation,



and local depletion are chiefly to be relied on; and in the more chronic forms tonics, astringent washes, and counter-irritants—in short, the ordinary principles of surgery suggest all that is known with regard to the treatment of these aural inflammations.

The sudden stopping of a discharge from the ear is popularly looked upon with great suspicion, especially when it has been arrested by local applications; but "there can be no doubt," says Mr. Toynbee, "that the cessation of the discharge is one of the *effects* and not one of the causes of the inflammation . . . . . the symptoms that follow are not dependent upon the cessation of the discharge [for *it* does not always diminish], but upon inflammation caused by the irritant." We see in other parts of the body that an amount of inflammation may be set up by some local application with which purulent formation seems incompatible. But it all comes to this,—beware how you tamper with an external auditory meatus from which flows a discharge, for it contains all the elements of great danger to your patient, and you may set them loose upon him when you least expect it. Mr. Toynbee advises rather to treat symptoms, and to remove by attention to the general health every obstacle to cure, and then, though the aural surgeon see the disease make very slow progress towards *amelioration* (*sic*), he must be content that its "advance towards the bone and the brain is averted." The reader is here inclined to open his eyes—Allah, bismillah! your servant has eaten dirt; he has crept through layer after layer of epidermis, dermis, &c.; and he is now only taught how to make his patient *no worse*.

Again, the discharge is frequently only a symptom of more internal disease, and perhaps of some irritation, in the tympanum; or, in children, it may be more superficial than you wot of, merely the dermis secreting a watery fluid which floats off the "epidermoïd cells;" or some little sequestrum trying to escape through the fibrous meatus; or there may be some "raspberry cellular polypi," or granulations exuding pus, which little growths, Mr. Toynbee says, sometimes arise from obstruction of the Eustachian tube. Of how this should cause them to grow, we would like some explanation.

Other growths are apt to form in the meatus, the most curious being the slow-growing exostosis, which very much resembles the excrescence on a beech-tree, and gradually fills up the passage, causing deafness. The temporal bone seems, above all others, addicted to these bony outgrowths; Schmalz, Otto, and many others, record instances; Kramer tells of one which hung like a stalactite from the roof of the meatus. They seem to be somewhat under the influence of iodine locally applied.

The membrana tympani, the driest membrane of the body, has absorbed the attention of many who saw different beauties in it, attributed to it different functions, and demonstrated in its gossamer thickness different layers of very problematical fibres. Where are now the radiated muscular fibres of Sir Everard Home? where Sir Astley Cooper's perforation of the tympanum? Instead of the one, we have a "bilaminated fibrous layer," and instead of making holes

we stop them up. But all agree "that it is the agent whereby vibrations are conveyed from the meatus externus to the tympanum, and in conjunction with the muscles and the bones of the tympanum acts as the analogue of the iris."

Should a hole large in proportion to the area of the membrane occur, then it is evident that the vibrations of the air in the tympanum would no longer be confined within that cavity, and in consequence, would strike more feebly against the membrane of the fenestra rotunda. With this state of matters of course must coexist a diminution of the hearing power, and the obvious indication is to keep the air in the tympanum; we may do so by inserting a little plug of moistened wool, as suggested by Mr. Yearsley in 1848, or by Mr. Toynbee's elegant little caoutchouc diaphragms.* These gentlemen differ as to the *modus operandi*, and Mr. Wilde says "that we still require a feasible solution for it;" but we think that Mr. Toynbee's is a very satisfactory one. Given a drum with a hole in it, to restore its resonance. Answer: "Stop up the hole, or put a new skin on." However it acts, all these gentlemen, and no doubt many besides, have treated cases successfully with the plug or diaphragm. Mr. Toynbee says he has treated hundreds beneficially; they could hear voices across a room, and one heard "the voices of boys at a *distance of between one and two fields.*" There is something so pleasant in the thought of the habitually unhearing man being roused in his moody walk by the lads' merry voices ringing in the quiet summer gnatiferous English evening air, that we forgive him who measures "hearing distances" by inches, the vague estimate of "one or *two* fields."

Mr. Toynbee gives a minute account of the articulation of the stapes, describing its being hung, as it were, upon ligamentous fibres which pass from within towards its tympanic surface. Dr. A. Tröltsch, on the other hand, denies that it has further connexion with the vestibule than what it obtains from the periosteum of the latter spreading across its base. From his own dissections, the writer would be inclined to agree with Mr. Toynbee, but no joint (if we may call it such) in the body seems more liable to change of form than this; indeed, we rarely find the margins of the fenestra ovalis alike in two subjects. In some, one side, or perhaps both, are expanded as a lip over the aperture, preventing any motion except upwards and downwards; in others, the base of the stapes seems to have become, as it were, one with the fenestral margin, and cannot be displaced even by force applied from the vestibule. This ankylosis of the stapes, which Mr. Toynbee tells us is such a common and irremediable form of deafness, is termed by Tröltsch, calcification of the fibrous structures at its base. It seems to be a change consequent on age or the rheumatic diathesis.

There are some points in the anatomy of the ear which we regret have not been more fully discussed, one is the chorda tympani; the German anatomist we have just quoted describes the results of some experiments

* See No. 24 of this Review, page 460, for a notice of Mr. Toynbee's observations on his artificial membrana tympani.



with galvanism upon this nerve, by which he finds that the stimulus directly applied to it produced a peculiar sensation on the tongue.

What *is* the chorda tympani? Mr. Wilde adheres to the theory that it is the vidian branch of Meckel's ganglion, though we never could see any good proof for this statement, but would refer the reader to Professor Luigi Calori's paper on this nerve, in the 'Transactions of the Royal Society of Bologna,'* for a clear and philosophical description of this mysterious nerve.

We confess to having expected in such a recently published work as Mr. Toynbee's, that there would be some more on the subject of the cochlea than we find. It is, indeed, most probable that Dr. Thomas Young was very near the truth when he called it a "micrometer of sound," for there seems little doubt that the rods of Corti form with the terminations of the cochlear nerves so many acoustic arrangements by which musical sounds are appreciated. We may grant, then, this function without confounding it with what Goodsir terms "the æsthetic perception of the sensations produced by the instrumentality of the cochlea,† its nerves, and the sentient centre, which is a psychical function and a result of the pre-established harmony between the mental and corporeal elements of the animal constitution on the one hand, and external nature on the other."

Mr. Wilde says that "the musical ear in many instances remains unimpaired, though general hearing is much affected;" and Mr. Toynbee has shown in one very interesting case, that the dormant powers of an ear may be roused to usefulness by the stimulus of sound. It is possible that in many deaf ears there may be some part left in which its integrity may be reached by sounds, or that class of sounds appropriate to itself.

What every student who takes up these volumes must remark, is the constant repetition of certain remedies, the syringe, the blister, and ear trumpets. Unto this last too many cases come.

It gives one a melancholy idea of therapeutics in general, when we see no greater practical result follow such good and vigorous work; but if these writers had done nothing more than convince their professional brethren of their ignorance, of the possibility of and necessity for careful diagnosis of aural maladies, we should owe them a deep debt of gratitude, but more especially as they have and will induce many to follow up their investigations in the same spirit of patient inquiry, and send more physiological Livingstones to explore the half discovered country, and the great river of living waters of knowledge—

> "Along whose margin
> Grows the wondrous tree
> Whose leaves shall heal the nations."

* Sessione delli 18th Nov. 1852. † Edinburgh Monthly Journal, 1854.

## Review IV.

1. *An Account of the Life, Lectures, and Writings of William Cullen, M.D., Professor of the Practice of Physic in the University of Edinburgh.* By John Thomson, M.D., F.R.S. L. & E., Professor of Medicine and General Pathology in the University of Edinburgh. In 2 vols. Vol. I. first published in 1832, now re-issued along with the second volume, and having prefixed to it a Biographical Notice of the Author. Vol. II. commenced by Dr John Thomson and Dr. William Thomson, and concluded by David Craigie, M.D., F.R.C.P.E., F.R.S.E., &c. &c.—*Edinburgh and London.* 1859. pp. 1524.
2. *The Works of William Cullen, M.D., Professor of the Practice of Physic in the University of Edinburgh; containing his Physiology, Nosology, and First Lines of the Practice of Physic, with numerous Extracts from his Manuscript Papers, and from his Treatise on the Materia Medica.* Edited by John Thomson, M.D., F.R.SS. L. & E., &c. &c. In 2 vols. 8vo.—*Edinburgh.* 1827.

We hope that when, a year and a half ago, the bulky volumes which stand first of those prefixed to this article were given to the world, the editors did not delude themselves with the idea that their perusal from beginning to end was at all probable. Surely the commonest charity would forbid the imposition of such a task upon any but the most idle. It grieves us to state that a more injudicious compilation, or a more oppressive attempt at professional bookmaking, it has never been our lot to meet with. And the life and labours of such a masterly and perspicuous teacher as was Cullen have no business to be made a clog upon any library table, when we might have had a pleasant and readable narrative of that illustrious physician. It would appear that in the year 1832 Dr. John Thomson, of Edinburgh, published that first volume of the 'Life of Cullen' with which most of us are familiar, giving assurance to the public that this instalment of biography should in due time be followed by a supplementary issue. This assurance, however, was not fulfilled until years after the death of the elder Thomson. The work, indeed, was in progress, but received a temporary interruption by the removal from Edinburgh to Glasgow of the author's eldest son, who had greatly assisted him in the compilation. The subsequent decline of the father's health, his death in 1846, the son's increasing professional duties in his new sphere, followed also by death in 1852, have thus, until recently, prevented the fulfilment of a design which both Dr. John and Dr. William Thomson had deeply at heart, and for the accomplishment of which they laboured diligently. A younger brother and son (Dr. Allen Thomson) now appears upon the scene, and, charging himself with editorial superintendence, consigns a huge amount of historic labour to Dr. Craigie, contenting himself with a graceful dedication to Sir Benjamin Brodie, a history of family antecedents, and a general



arrangement of this second volume. So that the work, in its complete and bi-volumed form, which has been thus launched upon the crowded and restless sea of literature, is something more than a biography of Cullen. It is, in fact, a biography of that great physician; but it is also a biography of Cullen's two biographers. In short, eighty-four pages are devoted to a sketch of Dr. John Thomson, eight pages to a notice of Dr. William Thomson, and the remaining fourteen hundred and thirty-two to matters which bear directly or indirectly upon the author of the 'Nosology' himself. We are not at all disposed to question the "rare learning in the general history of medicine" which Dr. Allen Thomson attributes to his friend Dr. Craigie; but we cannot help thinking that this very learning has been the cause of much irrelevant disquisition and of much intolerable prolixity. The amount of space, indeed, which is devoted to the conflicting opinions of those who may not have thought with Cullen is quite extraordinary; and the reader is lost in bewilderment at views and theories which might have been "buried in the night of oblivion," inasmuch as they are not only not at all essential, but absolutely detrimental, to the elucidation of Cullen's career. To take one instance: in the second volume alone, two hundred and eighty-four pages (besides nine pages in the Appendix) are devoted to an elaborate disquisition of "Brunonianism," and to a history of the Italian medical doctrines springing therefrom. Who on earth but an unhappy "reviewer," to whom such things are a necessity, can afford time or patience for so minute an analysis of the "new, perfect, and unalterable system" of Dr. John Brown? Even the editors themselves (we speak plurally) seem startled at the nature of the country over which they have dragged us, and lead us back again, after a protracted diversion, to the nominal subject of this memoir, in the following language: "We have at length traversed the rugged and thorny regions of controversy and misrepresentation; of rival conflicting and disputed claims; of alleged discoveries, reforms, and improvements in medical theory and practice." (Vol. ii. p. 506.) It is to be wished that Drs. Allen Thomson and Craigie had been under the pressure of a more condensed atmosphere than they appear to have breathed during the construction of this biography, and that they had been more mindful of what he whose theories they expound has written: "My business is not so much to explain how this and that happens, as to examine what is truly matter of fact; my anxiety is not so much to find out *how* it happens, as to find out *what* happens."*

From a paucity of biographic materials, which the editors themselves deplore, and which makes the great bulk of this work more inexcusable, we shall endeavour to furnish our readers with a compendious narrative of a physician who, without having ever manifested a high order of intellectual faculty, is yet more associated in our minds with the medical progress of the last century than any other individual.

William Cullen was the second of a family of seven sons and two

* Works, vol. i. p. 447.

daughters, and was born at Hamilton, on the 15th of April, 1710. At the grammar-school of that town, and afterwards in the University of Glasgow, he received his education, and cultivated those qualities by which he was ever afterwards distinguished—great quickness of apprehension, and a very remarkable memory. In the great Scottish centre of industrial commerce he likewise initiated his medical career, being apprenticed to a general practitioner or apothecary of the name of Paisley. Finishing his studies there towards the end of 1729, the young Cullen went to London, with a view of obtaining a situation in which he might enjoy opportunities of acquiring a practical knowledge of his profession. It is not narrated (though the subject is suggestive of speculation in reference to that puzzle of puzzles, a modern 'Bradshaw') what time was occupied in the transit from one city to the other. The fact, however, is on record that Mr. Paisley's pupil did not remain long in London, for he was almost immediately appointed surgeon to a merchant vessel trading to the Spanish colonies of the West Indies, whose captain was a Scotchman and a relation of his own. During the voyage thither, and there, he had the advantage of observing the diseases peculiar to those latitudes, and the effect of climate upon the human constitution. In the beginning of 1732 young Cullen returned to Scotland, to find himself the eldest surviving son, charged with the duties of arranging the affairs of his father (who had been dead some years), and providing for the education and settlement of the younger branches of the family. Fortunately for both parties, his late commander (Captain Cleland) had returned also to his patrimonial estate of Auchinlee, in the neighbourhood of Hamilton, and he invited William Cullen to reside with him and superintend his son, who was afflicted with a lingering disorder. Here the young medicus had abundant opportunities of study, of which he fully availed himself. Two years later, succeeding to a legacy by the death of a relative, he again crossed the Border, and resided with a dissenting minister in Northumberland, where he gave himself up to philosophy and general literature. The winter sessions of 1734–5 and 1735–6 were spent in Edinburgh; but Cullen did not graduate in medicine until five years later, at the University of Glasgow. Those years were occupied in general practice in his native town, where the afterwards celebrated Dr. William Hunter (whose theological tendencies were diverted by Cullen) resided with him for awhile as friend and pupil. It is curious that after this relationship between them ceased, these two great men never met but once again, though they continued to the last to maintain an intimate and familiar correspondence. In the autumn of 1744, Dr. Cullen, having been twice elected a borough magistrate, and once married, relinquished his general practice in Hamilton, and settled as a physician in Glasgow. The following extract from a letter of William Hunter to Cullen, in 1745, will be read with interest:

"Well, how does the animal economy appear to you, now that you have examined it, as one may say, with precision? I have good reason to put the question to you, because, in my little attempts that way, since I began to think



for myself, Nature, where I am best disposed to mark her, beams so strong upon me, that I am lost in wonder, and count it sacrilege to measure her meanest feature by my largest conception. Ay, ay, the time will come when our pert philosophers will blush to find that they have talked with as little real knowledge, and as peremptorily of the animal powers, as the country miller who balances the powers of Europe." (Vol. i. p. 21.)

It would seem that at this period there were University Professorships to which little or no duties were attached, save the innocent one of receiving fees. Such a state of things but little accorded with the active and enterprising genius of William Cullen. He made arrangements, therefore, to remedy this abuse, and agreed with Dr. Johnstone, Professor of Physic in the Glasgow University, to deliver a course of lectures during the winter of 1746 on the Theory and Practice of Medicine. In the session of 1747, the University authorities having fitted up a laboratory, he also lectured on Materia Medica and Botany, with Dr. Hamilton's assistant. In a few years Dr. Johnstone resigned his sinecure professorship, and Dr. Cullen succeeded him, inaugurating the wise change of delivering his lectures in a living rather than in a dead language. This circumstance, of course, like all innovations upon established customs, gave rise to opposition, and to insinuations of the most unfounded character as to the new Professor's imperfect acquaintance with the Latin tongue.

Among Dr. Cullen's pupils at this period was the afterwards celebrated Dr. Joseph Black, whose "emulous spirit" and acute perceptive faculties were at once recognised by the preceptor, and encouraged in the student. Cullen's own studies and tastes seem to have taken a chemical bias during his association with Black; and he subsequently displays in his correspondence a timid but noble delicacy lest his own progress (for the teachers of chemistry were but then learning it as they taught) should be greater than that of his pupil, and his own discoveries anticipate those of one whose genius he had had such peculiar pleasure in fostering. When Black was afterwards studying in Edinburgh, he frequently communicated literally with Cullen; and the following extract from one of the former's letters illustrates the point above alluded to:

"I received your packet of chemistry, which rejoiced me extremely. A new experiment gives me a new life; but I wonder at the reserve and ceremony you use with respect to me. Did I learn chemistry from you only to be a bar to your inquiries? The subject is not so limited as to be easily exhausted, and your experiments will only advance me so much farther on." (Vol. i. p. 49.)

There can be little doubt that the data from which Black subsequently elaborated his theory of Latent Heat were in a measure furnished by Dr. Cullen's lectures, and from his Essay on Evaporation.

But our Professor's chemical studies were much too comprehensive to be limited only to their bearing upon the science of medicine. His researches, indeed, gave a strong impetus to agricultural and industrial science; and he introduced a few lectures on Agriculture into his chemical course. Does not his correspondence with Lord Kames, upon the subject of manures and the general cultivation of land, show that he was the Liebig of his day?

"Do not forget," says his Lordship in a letter to Cullen, bearing date, Edinburgh, Dec. 26th, 1752, "your letter upon husbandry; having been entertained with no new theory now for a long while, I am sinking into a mere practical farmer. I have not a single new thing at present, except one experiment I am making to convert moss into dung by endeavouring to rot it in a dunghill by mixing it with fresh horse-dung."* "I no sooner get a moment's leisure," he says again, "than I think of my old project for you about agriculture [publishing a work on that subject]. I would not be surprised if you were offered 200*l.* for the copy."

A manuscript composition, entitled 'Reflections on the Principles of Agriculture,' was afterwards found among Cullen's papers, and shows that he had made some progress in the course indicated by his noble friend. There was also a manuscript essay, 'On the Construction and Operation of the Plough,' which had, in all probability, been read before the Philosophical Society in the Glasgow College, and which an intelligent farmer who proposed the substitution of iron for wood, spoke of as the first attempt "to account for the structure of that machine upon mathematical principles." An essay by Dr. Cullen, entitled 'Remarks on Bleaching,' was presented to the Board of Trustees for the Encouragement of Fisheries, Arts, and Manufactures, in Scotland; and it is mentioned in the records of that Institution for June, 1755, that "three suits of table-linen had been given to Dr. William Cullen for his ingenious observations on the art of bleaching."

It should be observed that a few days after Dr. Cullen's admission to the Professoriate in the University of Glasgow, Dr. Adam Smith was appointed by the Faculty to the Chair of Logic; and that on the death of Dr. Craigie, in 1751, the author of the 'Wealth of Nations' was translated to Dr. Craigie's chair—that of Moral Philosophy. By this removal the Professorship of Logic became vacant, and tempted three candidates—two of them of no mean reputation—into the field. They were David Hume, Edmund Burke, and Mr. Clow. The latter gentleman proved successful; but the contest was fraught with unusual interest to Cullen, who warmly supported the cause of the historian, and laid thereby the foundation of an enduring friendship. The following letter, addressed to Dr. Cullen by Hume, after his defeat, is far more interesting than a disquisition on "Brunonianism," and we make no apology for presenting it to our readers:—

"Sir,—The part which you have acted in the late project for my election into your College, gave me so much pleasure, that I should do myself the greatest violence did I not take every opportunity of expressing my most lively sense of it. We have failed, and are thereby deprived of great opportunities of cultivating that friendship which had so happily commenced by your zeal for my interests; but I hope other opportunities will offer, and I assure you that nothing will give me greater pleasure than an intimacy with a person of your merit. You must even allow me to count upon the same privilege of friendship as if I had enjoyed the happiness of a longer correspondence and familiarity with you. For as it is a common observation that the conferring favours on another is the surest way of attaching us to him, I must by this

* See Prize Essays and Transactions of the Highland Society of Scotland, vol. ii. p. 130.



rule consider you as a person to whom my interests can never become altogether indifferent. Whatever the reverend gentlemen may say of my religion, I hope I have as much morality as to retain a grateful sentiment of your favours, and as much sense as to know whose friendship will give greatest honours and advantage to me.

"I am, Sir, your most obedient and most humble servant,

"DAVID HUME.

"Edinburgh, 21st Jan. 1752."

In the autumn of 1755, an opportunity occurred of carrying out a project which had long been urged upon Cullen by his friends, and particularly by Lord Kames, that of removing to Edinburgh. After a tenacity of office (not infrequent in every profession and in every age) long after years and manifold infirmities had incapacitated him for active duty, Dr. Plummer, the Professor of Chemistry, was compelled to admit a partner into his Chair. That partner was Dr. Cullen, who henceforth delivered the lectures on chemistry at the University of "Modern Athens," and was promised the full succession on Plummer's decease. There were circumstances in connexion with this appointment which were highly creditable to Dr. Joseph Black, who for some little time previously had assisted Dr. Plummer, upon the recommendation of Cullen himself, and who might, had he so minded, have turned that position to his own beneficial account. He was the first person, however, to inform his old preceptor of an attack of palsy which had struck down the Professor of Chemistry, and thus rendered necessary the appointment of a working coadjutor in that chair. Great jealousy was created among the Edinburgh doctors by the removal of Cullen to the sphere in which they themselves revolved. His Glasgow success and reputation had run before him, and made them tremble for their professional prospects. They even objected to the professorial appointment, that it had been made without the consent or "demission" of Dr. Plummer, who himself had resolved to oppose it, and even refuse the use of the chemical laboratory, which was his own private property, without a very adequate pecuniary compensation. Ultimately, however, a commission was signed on the 10th of March, 1756, by the Senatus Academicus and the Town Council of Edinburgh, electing Drs. Plummer and Cullen joint-professors of chemistry in the University. Happily, the elder partner in this firm did not long survive. In July following he gave up his chair and his life, and the younger partner succeeded to the full honours and emoluments of the chemical professorship, which he retained for a period of ten years.

The removal to a new place of residence, even under such advantageous circumstances as those which surrounded Cullen, were not unattended with difficulties. Practice did not begin immediately to furnish the exchequer in Edinburgh; and an injury to his leg, which kept the Doctor for some time a prisoner to the house, yet further increased his embarrassments. But he was not the man to be discouraged, and he had laid to heart what his friend, William Hunter, had lately written to him, concluding a letter in the following language:—

"I have found a specific in the author of the Georgics, against the spleen that is occasioned by *Pauperies*, which has been a wonderful palliative cure, at least with me, and has almost reconciled me to charms; as I have no doubt of its efficacy, in every case where there is faith enough, I will communicate it to you:

'Labor omnia vincit
Improbus, et duris urgens in rebus egestas.'"

In order that his time might be fully occupied until he had secured active professional engagements, Dr. Cullen now proposed to himself the translation of Van Swieten's 'Commentaries on Boerhaave's Aphorisms.' But the desiderated practice came on so rapidly after this intention, that the design was abandoned for duties connected with a sphere of more immediate usefulness. Of these, besides the private practice, was the elaborating that system of clinical instruction first commenced by Dr. Rutherford in the year 1748, in the Royal Infirmary of Edinburgh, by a special privilege of its managers. The same privilege was extended to the other university professors, though none appears to have availed himself of it till 1757, when William Cullen was at the bedside with a group of attentive pupils.

"Few (say the editors), if any, traces of the useful and important mode of teaching practical medicine by example are to be found in the early records of physic. Hippocrates, indeed, we are told by Galen, was in the use of conducting his numerous pupils to the bedsides of his patients, for the purpose of instruction; and from a well-known epigram of Martial (which, on account of the warning it contains, ought never to be forgotten by clinical teachers or their pupils), it appears that in his time a similar practice was followed by one at least of the physicians of Rome.

"'Languebam; sed tu comitatus protinus ad me
Venisti centum, Symmache, discipulis.
Centum me tetigere manus, Aquilone gelatæ,
Non habui febrem, Symmache: nunc habeo.'—Lib. v. Epis. 9.

"Some centuries after the introduction of the Christian religion, the conjunction of hospitals for the reception of the sick poor with medical schools, is said to have been effected in the schools of Alexandria, in Egypt; of Gandasipora, in Persia; and of Edessa, in Mesopotamia; and in the great seminary of learning which flourished at Bagdad, attendance on hospitals is said to have formed a constituent and important part of the system of medical education." (Vol. i. pp. 102–3.)

The practice of clinical instruction commenced in Italy, in the schools of Padua and Pavia, about the middle of the sixteenth century; but for some reason or other, it was soon forbidden or suspended. Later than this—in the beginning of the seventeenth century—it was introduced into Holland, at Utrecht and Leyden. From the latter school, in fact, it came to Edinburgh, through the medium of Dr. Rutherford, who had been a pupil of the illustrious Boerhaave at the literary metropolis of the Dutch Provinces.

It is recorded that Dr. Cullen possessed in a very remarkable degree the qualifications necessary for a clinical teacher. He had great power of observation and description of disease, a real interest in imparting instruction to others, and a degree of candour rarely met with in reference to acknowledgment of diagnostic errors. In one of his lectures he remarks:



"It is not improperly said that the earth hides the faults of the physician. If every patient that dies were opened, as ours has been, it would but too often discover the frivolity of our conjectures and practice. In these lectures, however, I hazard my credit for your instruction, my first views—my conjectures—my projects—my trials—in short, my thoughts—which I may correct, and, if necessary, change; and whenever you yourselves shall be above mistakes, or can find anybody else who is, I shall allow you to rate me as a very inferior person. In the mean time, I think I am no more liable to mistakes than my neighbours, and therefore I shall go on telling you of them when they occur."

Of course the deductive method which Cullen pursued in his investigations rendered him peculiarly prone to error, and its frequent correction by facts which annihilated his theories. Like all the great Scotch writers, he argued from principles to facts, and not from facts to principles.

"His system is constructed by reasoning from general principles; and of that process he certainly was a consummate master. Between the premisses and the conclusion, he hardly ever lets error creep in. And in reference to the results of his speculations, he had one immense merit, which will always secure to him a conspicuous place in the history of pathology. By insisting on the importance of the solids, he, one-sided though he was, corrected the equal one-sidedness of his predecessors; for, with extremely few exceptions, all the best pathologists, from Galen downwards, had erred in ascribing too much to the fluids, and had upheld a purely humoral pathology."*

Such, indeed, and so remarkable was Cullen's success as a clinical teacher and lecturer, that he was regarded by those who best knew his qualifications, as the proper successor to the Chair of Medicine, when its vacation should occur, by the death or resignation of Dr. Rutherford. It should be mentioned, however, that in the days of which we write the theory and the practice of medicine were regarded as so distinct from each other as to require two separate professors. There was, in fact, a chair of theory and a chair of practice. The latter was the one occupied by Dr. Rutherford. A little jobbing and finessing appear to have characterized the proceeding which eventuated in the succession to his post. Dr. Rutherford had imbibed some prejudice against Dr. Cullen, which made him unwilling to resign in favour of that physician. There was a gentleman, however, at Aberdeen, towards whom he had no disfavour; and Dr. John Gregory, of King's College, was summoned from the chair of physic in the northern city to wear the more patrician mantle which was slipping from the shoulders of Dr. Rutherford. A great deal of bad feeling and worse writing obtained in Edinburgh upon this occasion. The warm attachment of Cullen's many friends aroused the malicious onslaught of his jealous enemies, for whom (wrote to him William Hunter) "you will always find contempt a most excellent cordial." In February, 1766, Dr. Gregory was declared the successful candidate. By a singular coincidence, the death of Dr. Whytt a few months afterwards vacated the chair of the *Theory* of Medicine, to which Cullen was at once and unanimously summoned, though he had partaken so freely of his friend

* History of Civilization in England, by Henry Thomas Buckle. Vol. ii. p. 515. London, 1861.

William Hunter's cordial, as to wish to lay himself under no further obligations to the body in whom the appointment was vested. Dr. Joseph Black succeeded to the Professorship of Chemistry. But even now matters were not arranged to universal satisfaction. Dr. Gregory's talents were not unrecognised: but there sprang up a general feeling that the two chairs of physic should be united, and that alternate lectures should be delivered by either Professor on the theory and practice of medicine in combination. This was effected in 1769–70; and, three years later, on the death of Gregory, the author of the "First Lines" reigned solus and supreme as Professor of the Practice of Physic in the University of Edinburgh.*

"Such (it is truly observed) were the difficulties to be overcome, and such the exertions required to procure, first, a place in the University of Edinburgh, and afterwards the proper situation in it, for the man whose genius, talents, and industry shed such a lustre over the institution, and continued in so remarkable a degree to extend and to perpetuate the fame of its medical school!" (Vol. i. p. 161.)

Whatever and how great may have been the merits of his predecessors, it is admitted on all hands that the office which Cullen was now called upon to fill did not lose in usefulness or dignity by his succession thereto. Indeed, it may be affirmed that of the many distinguished professors who had added to the reputation of the Edinburgh school, none had ever surpassed, not to say equalled, the latest occupant of the chair of physic. "To an intimate acquaintance with the theoretical and practical writings of his predecessors and cotemporaries, he was known to unite a vigorous and discriminating understanding, matured by long-continued observation and experience, with the most felicitous powers of exciting the curiosity and directing the pursuits and studies of his pupils." (Vol. i. p. 258.) Though he had been Professor of the Theory of Medicine, Cullen could not but regard the theoretic as something very subordinate to the practical. He never lost sight of this in all his subsequent career. "My general doctrines," he writes, "are only to be so many general facts." "The cure of disease is the ultimate end of all our studies." And yet the theoretical could not be excluded from a deductive mind; and many of the "nosologist's" own theories were sufficiently fanciful, and such as few observers of the present day would be willing to endorse. Moreover, they were often contradictory, especially when he indulged in therapeutic speculations, and elaborated his views upon the 'Methodus Medendi.' Not that we say this at all reproachfully. Theories, like generations, live and die, and retain their vitality for various periods. It must ever be so within the range of sciences which are progressive, and lack the element of mathematical exactness. And we much doubt if contradictions quite equal to any which ever emanated from the pen of Cullen are not to be found in the published works of most medical writers since his day.† But we have small space for theoretic contradictions. It will not do for us, in an age which has witnessed such rapid strides in physiology and chemistry, of which we endeavoured to give a biographic culmination in a recent number,* to recur, save for the simple statement of the facts, to any laboured exposition of the doctrines of the animal economy as propounded a century ago.

"All, all are gone, the wild Arabian tale,
Aladdin's lamp, and Sinbad's magic sail."

Our views are somewhat expanded as to that "human system" which Cullen regarded as "a chemical mixt, as a hydraulic machine, and as an animated nervous frame."† The huge accumulations in Dr. Thomson's volumes of theories long since exploded, of disputes long since forgotten, and of fallacies whose reproduction can serve no purpose but that of the reader's embarrassment—how shall we censure them, and yet minister in our small measure to their circulation? It may be sufficient to state that the author of the 'First Lines' was equal to the science of his time, and beyond the general information of his period. By the light which he had he stumbled less than his cotemporaries, and wooed by his earnest and searching spirit the dawn of an expanding future.

In the year 1774, Dr. Cullen, in conjunction with many others who were equally interested in the progress of medical science, drew up a memorial to the Government on the subject of the "shameful traffick of degrees in physic" carried on by the Universities of Aberdeen and St. Andrew's. At the request of the Duke of Buccleuch, who had just been elected an honorary Fellow of the College of Physicians in Edinburgh, then under Cullen's presidency, this memorial was submitted to Dr. Adam Smith, his Grace's friend and quondam travelling companion on the Continent of Europe. The author of the 'Wealth of Nations,' however, was not at all disposed to embrace the views of the memorialists, and in an amusing and ingenious letter to Dr. Cullen he submits his reasons for non-acquiescence in their petition. "Monopoly of medical education" was no more to his taste than monopoly in trade and commerce. He did not mean to defend the signing of a certificate of professional competence of a man of whom nothing, or next to nothing, was known; but he could not see how the public suffered by such a step. "That doctors are sometimes fools, as well as other people, is not, in the present times, one of those profound secrets which is known only to the learned." "Do not all the old women in the country practise physic without exciting murmur or complaint? And if here and there a graduated doctor should be as ignorant as an old woman, where can be the great harm?" Dr. Adam Smith main-

* It appears that Dr. Cullen, with Dr. Gregory's permission, and in deference to an unmistakeable feeling among the students, delivered one course of lectures on the practice of medicine before the conjunction above alluded to was effected. This was in 1769.

† We may cite the following as very innocent and natural instances of contradiction: The Doctor writes in his 'Treatise on the Materia Medica': "Whether we can add anything to the powers of life is to me very doubtful. If they are already sufficient for their purposes [the retention of life?], all our attempts to carry them further must be superfluous, and we can have this indication only in cases in which these powers are for the time deficient." "Tone may be considered as a state of the inherent or contractile power of the moving fibres, but at the same time the inherent power is in a very constant dependence upon the animal, and therefore tonics increase the inherent power, by increasing the vigour or continual energy of the animal power." "Stimulants are indicated in all cases of languid motion; that is, not merely in weakness, but in all cases when the motion of the system is inert, weak, and slow."

* *Art.*, Müller and Orfila. † Works, vol. i. p. 409.

tained that a degree granted upon the most rigid examination gave no real security for anything but the science of the examinee. It could not attest his honesty, or his discretion, or his social acquirements, or his capacity for practising that art which, to be successful in the highest sense, exacts largely from these collateral aids. In a Latin discourse delivered about two years afterwards, Dr. Cullen combated the free-trade fallacies of his friend, in respect of the introduction of such principles into the realms and relationships of science. If that "solitary Scotchman (to adopt the language of Mr. Buckle) who by the publication of one single work contributed more towards the happiness of man, than has been effected by the united abilities of all the statesmen and legislators of whom history has preserved an authentic record,"* could now look upon our progressive land, he would recognise the complete triumph of his principles in their legitimate sphere—that of commercial enterprise; but he would at the same time note their downfall, and acknowledge the justice of that downfall, in improved medical legislation, in larger requirements and more searching tests, and in an elevation of character and general attainments, in all who are engaged in assuaging the physical and mental diseases of mankind.

It was not until comparatively late in life that Dr. Cullen's literary career commenced—literary, that is, in the sense of publication. His 'Nosology' was first given to the world in 1769, in which he simplifies the classifications of disease proposed by Sauvages, Linnæus, and Vogel. It ran through four editions in the author's lifetime; the last, containing his latest corrections, and exhibiting his nosological labours in their most finished form, appearing in 1780. Into this later edition was also introduced the classification of Sagar, as embodied in his 'Systema Morborum Systematicum.' The 'Outlines of Physiology' was first published in 1772, and made a considerable sensation at the time of its appearance. It ran through three editions, a translation of the last appearing at Leipsic in 1785, under the title of 'Anfangsgründe der Theoretischen Arzneiwissenschaft.' The 'First Lines of the Practice of Physic,' though contemplated for more than thirty years, did not appear (the first volume) until 1776. The second volume was published in 1779, the third in 1783, and the fourth and last in 1784. A translation of this work into French was brought out by the great alienist physician Pinel in 1785. We cannot undertake to follow the editors through the seventy pages which they devote to the discussion of the first of the above-named works. A pupil of Cullen's at Edinburgh, who afterwards attained a great reputation as an able physician (Dr. Currie), has thus recorded his estimate of his preceptor's nosological labours:

"With more comprehensive views than Sauvages, a more lucid order, and a happier simplicity, Dr. Cullen divided the whole body of diseases into four classes and twenty orders. In his definitions, he excels in accuracy all who have gone before him; and it is, indeed, his distinguished and peculiar praise, that, not only in his 'Nosology,' but in his 'First Lines,' his descriptions of diseases receive no colouring from his theories, but are everywhere faithful to nature.' (Vol. ii. p. 75.)

* History of Civilization in England, vol. i. p. 197. London, 1859.



A later physician and physiologist (Dr. Wilson Philip) thus writes:

"It is not Dr. Cullen's praise that he invented an ingenious hypothesis, but that he new-modelled, if I may use the expression, the whole practice of medicine; that in his 'Synopsis Nosologiæ Methodicæ' he defined and arranged diseases with an accuracy that is still unrivalled; and in his 'First Lines' reduced their treatment to a degree of simplicity formerly unknown." (Vol. ii. p. 134.)

Speaking of the 'Nosology,' a French writer observes, "Celle de Cullen, qui parut en 1772, et qui *constitue un véritable progrès.*"*

Perhaps no better specimen could be given of Dr. Cullen's descriptive power and accurate observation than "the diagnosis drawn by his masterly pen" of hypochondriasis and melancholia. Dr. Bucknill has introduced it into his able work (with Dr. Tuke) on 'Psychological Medicine,' and speaks of its author as one "than whom no medical writer has ever been more accurate and logical in his discrimination of disease, according to the light which he possessed."

"Hypochondriasis I would consider as being always attended with dyspeptic symptoms; and though there may be, at the same time, an anxious melancholic fear arising from the feeling of these symptoms, yet while this fear is only a mistaken judgment with respect to the state of the person's own health, and to the danger to be from thence apprehended, I would still consider the disease as a hypochondriasis, and as distinct from the proper melancholia; but when an anxious fear and despondency arise from a mistaken judgment with respect to other circumstances than those of health, and more especially when the person is at the same time without any dyspeptic symptoms, every one will readily allow this to be a disease widely different both from dyspepsia and hypochondriasis, and it is what I would strictly name melancholia. In this there seems little difficulty; but as an exquisitely melancholic temperament may induce a torpor, and slowness in the action of the stomach, so it generally produces some dyspeptic symptoms, and from thence there may be some difficulty in distinguishing such a case from hypochondriasis; but I would maintain, however, that when the characters of the temperament are strongly marked, and more particularly when the false judgment turns upon other subjects than that of health; or when, *though relative to the person's own body, it is of a groundless and absurd kind;* then, notwithstanding the appearance of some dyspeptic symptoms, the case is still to be considered as that of a melancholia, rather than a hypochondriasis."

Nor is Dr. Cullen's descriptive power less evident in his handling of febrile phenomena. Indeed we are prepared to endorse unhesitatingly the opinions of the editors when they affirm:

"With whatever defects Dr. Cullen's general definition of his class Pyrexiæ or of his order Febres may be conceived to be chargeable, every well-informed and unprejudiced mind will allow that the history of the phenomena and progress of a febrile paroxysm, as given by him from the sixteenth to the twenty-third paragraphs of his 'First Lines,' is, both in respect of the minute fidelity of the delineation and of the clearness and conciseness of the language in which it is portrayed, a perfect masterpiece and model of medical description." (Vol. ii. p. 107.)

It is but too well known to the profession how abundantly fertile the subject of fever has proved in theoretic disputations; and it is but

* Renouard: Histoire de la Médecine, vol. ii. p. 231. Paris, 1846.

too well known to ourselves how largely the editors have availed themselves of the fact for purposes of digression. After all, we are not prepared to state that the question is not now as open a one as in the days when Cullen wrote and Armstrong blooded. The occurrence of local congestions is a matter beyond dispute, but whether they are dependent upon that "constriction of the extreme vessels" which prevented free capillary circulation, and so threw back the vital tide upon the larger channels and the viscera, is not ascertained with any certainty or precision. One thing, however, is certain—that Cullen regarded fever as essentially a disease of debility; and that for a consistent treatment founded thereupon he had the misfortune to incur the censure of Dr. Welsh, for "having succeeded in nearly interdicting the use of blood-letting in fever." In the forty-sixth paragraph of his 'First Lines' he writes:

"Upon the whole, our doctrine of fever is explicitly this: The remote causes are certain sedative powers applied to the nervous system, which, diminishing the energy of the brain, thereby produce a debility in the whole of the functions, and particularly in the action of the extreme vessels."

Dr. Mason Good is of the same opinion, and speaks of fever as "characterized by debility of the living fibre."

These views have been extensively assailed, both by the pen and by the lancet, by those from whose special experience we naturally should have expected the soundest views and the most judicious treatment. And to bring the phases and the fashions of this treatment down to our own day, we will but allude to the startling reaction which followed —which always follows— extreme opinions. The apostle of that reactionary movement has been taken away prematurely, and the doctrine which has been named "Toddism" (query—*Toddyism*) is now in its turn receiving no measured condemnation. As an experimental account of the chemical effects of alcohol upon the human economy has so recently appeared in this journal, we shall not now enter into a discussion which demands at once the most cautious judgment and the most abundant charity. We have heard the late Dr. Todd spoken of in terms of the greatest harshness and injustice by men who possess not a tithe of the knowledge or capacity which were his. But Cullen was so treated. Every great and original mind must be prepared for obloquy. "L'ambition c'est une candidature au martyre." For ourselves, we shall only venture to affirm in reference to the subject of fever and its treatment, that whatever theory of morbid action or of the right means of encountering its effects may obtain at this or at any period, we are persuaded that no recent writers have known more than Cullen knew; and certainly they have not succeeded in imparting their knowledge to their generation in language half so perspicuous as did their illustrious predecessor, when he wrote:

"This theory of fever amounts to no more than saying that there are certain states of the body which are combined together in a certain order of succession, and that for this constant combination they are to be considered as a series of causes and effects. This I assume as a fact, and I suppose that this connexion is determined by a certain mechanism or organization of the body, but I do not pretend to explain the nature of this. I might offer conjectures upon this subject, but while they are only conjectures, I shall not trouble you with them, so shall go no further."



But to turn to a less limited field, we may remark that there is abundant evidence in the writings of Dr. Cullen of his singular accuracy of observation. A physician of our own day, whose path has been sunned by a brighter scientific light, whose experience has been immense, and whose felicity of diction has caused his lectures to be regarded as the very perfection of medical literature, fully confirms Dr. Cullen in his views of the frequent connexion between hæmoptysis and phthisis pulmonalis, and of their league with what we term a scrofulous diathesis.*

Nor is the "Nosologist's" accuracy less remarkable in a disease (so to speak) of a less objective character—mellitic diabetes. For comparatively little was known in the last century of animal chemistry and of the morbid anatomy of the kidneys. And yet Cullen and Prout coincide in stating that the undue prevalence of the saccharine element in this disease is dependent chiefly upon defective assimilating processes in the stomach, though the later physician does not entirely separate diabetes from structural changes in the organs which secrete the urine. In short, there is reason to suppose that Cullen was not only a very accomplished physician, but a very safe and judicious practitioner. We can only discover one of the accidents of the life terrestrial in which, imbibing a fallacy now exploded, he must have expedited the translation of mortality to celestial regions. It was his custom to recommend the injection of tobacco-smoke into the intestinal canal in cases of drowning, the object being "to restore the action of the moving fibres." A letter, by the way, from Dr. Cullen to Lord Cathcart, on "The Recovery of Apparently Drowned Persons," if not the cause of, was at least strictly coeval with the foundation of our Royal Humane Society, which was instituted in London in 1774, in imitation of similar societies in Amsterdam, Milan, Venice, Hamburg, and Paris.

We have now arrived at that period in the life of Cullen when active duties cease and friends and companions are one by one removed; and there remains but to the good physician to

"Await alike the inevitable hour."

David Hume and William Hunter have both gone away into the untried country from which there is no return. The philosopher and historian died in August, 1776, and Cullen's account of the cheerfulness and serenity (which he himself personally witnessed) of the closing scene, as conveyed in a letter to William Hunter, is one of the most interesting records in these volumes. We shall give our readers its penultimate paragraph:

"These are a few particulars, which may perhaps appear trifling, but to me no particulars seem trifling that relate to so great a man. It is perhaps from

* See Dr. Watson's Lectures on the Principles and Practice of Medicine.

trifles that we can best distinguish the tranquillity and cheerfulness of the philosopher, at the time when the most part of mankind are under disquiet, anxiety, and sometimes even horror. I consider the sacrifice of the cock as a more certain evidence of the tranquillity of Socrates than his 'Discourse on Immortality.'" (Vol. i. p. 609.)

Seven years later (in March, 1783), William Hunter also surrendered to the rigorous besieger of the citadel of life. The foundations had long been sapped by hard work and "wandering gout," and at the age of sixty-five the garrison capitulated. But a yet greater calamity was in store for Cullen. In 1786, Mrs. Cullen expired at Ormiston Hill, the country seat which he had purchased sixteen years previously. Before this event, it would appear that the physician had shown some symptoms of depression, which the editors are not backward in attributing to the old enemy, "Dr. John Brown," and that "Brunonian" business to which we have before alluded. But these symptoms were clearly the natural failings of age, to which all men are obnoxious. It is not to be supposed that these indications of decline were lessened by his bereavement. But in the society of his daughter, the pursuits of his garden and his farm, and the composition of his last work—a 'Treatise of the Materia Medica'—he found no little measure of consolation. Of a truth, this is more than we have ourselves been able to discover, in the hundred pages devoted by the editors to the *ante* and *post* literature of this subject—pages which are most wearisome and unnecessary.

Dr. Cullen appears to have manifested considerable reluctance to resign his professorship in the University—a reluctance which perhaps he inherited from his predecessor, and which history teaches us is peculiarly susceptible of transmission. He did so, however, in 1789, and the patrons paid him the compliment of re-electing him, and appointing an "assistant and successor" to do the work of which he had really for some time been incapable. But Dr. James Gregory only acted in the former capacity for two months, for William Cullen died on the 5th of February, 1790, having attained the patriarchal age of eighty years.

Of his seven sons and four daughters, the third son, Archibald, who graduated M.D. at Edinburgh, and afterwards went to the English Chancery Bar, has proved the channel for direct lineal descent. His eldest son is now a Lieut.-General in H.M. Indian army, and Political Resident at Travancore, in the Madras Presidency. We trust that the name will not become extinct with him, and that though he has already exceeded the Psalmist's limitation, he may long survive that rigorous climate. It is a charity, likewise, to express a wish that his constitution may not be unduly depressed by the perusal of the volumes, from which we have managed with some difficulty to extract a continuous narrative of his grandfather's career.

In conclusion, we regret that we are unable to speak in higher terms of a work upon which it is evident there has been bestowed a great deal of care and attention, and whose publication in its now complete form is the result of labours extending over many years. These circumstances, however, do but make the case more distressing, and force from us the avowal that we would gladly exchange half the learning for twice the discretion here made manifest. In other words, we should have preferred a readable and compendious memoir to an elaborately discursive and pretentious treatise. If there is a man of all others on our ancestral roll of whom a well-constructed and pleasant narrative would have been welcome, that man is William Cullen; for he possessed in an eminent degree that correctness of principle, and sobriety of judgment, and freedom from ostentation, which have made reverential esteem for his memory a sort of professional tradition. His biography, in an available form, would be one of the healthiest things to put into the hands of those just initiating their medical studies, as well as of those who for years have borne the burden and heat of medical labour. In its present shape, however, it would weigh down the most ardent disciple of Æsculapius, and alarm him at the very portals of special literature; for the fact is not to be disguised, that the bulky tomes which we have now reviewed are a huge mistake, and these united biographies a ponderous infliction.



## Review V.

*On Diseases peculiar to Women; including Displacements of the Uterus.* By Dr. Hodge.—*Philadelphia*, 1860. pp. 469.

Another work on the diseases of women, of royal dimensions from unroyal America! Our friends across the Atlantic do not appear yet to have learned that brevity is the soul of wit, or that conciseness in writing is more practically advantageous than a multiplication of lines and pages. So, in the present instance, Dr. Hodge has entailed upon his readers the labour of wading through a large book for information that might have been much more usefully imparted in a volume a quarter the size. We do not mean to say that the book does not contain many very practical and useful observations; but the mass of uninteresting material within which they are enclosed will probably be a hindrance to their free circulation, especially amongst a profession whose members are notoriously disinclined to any unnecessary amount of reading. Dr. Hodge has divided his book into three parts, each containing several chapters. The first part comprises Diseases of *Irritation;* the second, *Displacements* of the Uterus; and the third, Diseases of *Sedation*. His opinion is, that the diseases peculiar to women may be traced to the effects of irritation and of sedation in the different tissues and organs of the economy, especially of the uterine system; and he lays great stress upon the important part which displacements of the uterus play in their production, devoting no less than nine chapters to the consideration of the various displacements of the uterus and their causes, symptoms, and treatment. We are ourselves impressed with the importance of such displacements as causes of much general disorder of the health, and are convinced that they deserve more attention than, for various reasons, professional men have

generally accorded them. They are, we are fully persuaded, frequently the obscure causes of many mental and bodily disorders, the source of much moral infirmity, and, in conjunction with constipation, the most fruitful exciters of hysterical disease. We fully concur in the following remarks of our author on irritable vulva and vagina. He says:

"By far the most frequent cause is uterine displacement, which, besides rendering the uterus sensitive, directly and indirectly affects the vagina, partly by the sympathetic extension of the symptoms of nervous irritation from the womb, and partly by the pressure, dragging, and similar sources of irritation from a prolapsed, retroverted, or retroflexed uterus." (p. 135.)

We may also add our belief that much of the vice of secret self-excitement is due to these causes, and may be remedied by replacing the uterus in its normal position, at the same time warning the subjects of them, with kindness and considerate argument, against the great evils to be apprehended by pursuing such practices, of which evils the unhappy patients themselves may have been entirely ignorant. No doubt so delicate a subject requires very delicate management; but a well-regulated mind will find out how best to deal with it; and why, we would ask, should we hesitate to try to obviate the consequences in the one sex more than in the other?

By the term *irritability*, our author simply means a capability of receiving impressions from surrounding agents, and thus producing phenomena. It is the "capability of being acted upon." The agents which excite or disturb the irritability of the tissues are termed "*irritants*." Those which depress or diminish its intensity are called "*sedatives*." An irritant, acting on the irritability of a part, produces an "*irritation*." A sedative causes a state of "*sedation*." The one is an exaltation, the other a diminution of vital excitements. One great object of the present work is to maintain that, in many cases, the independence of nervous diseases is complete; and also that, when complications exist demanding therapeutical assistance, the neurotic affection is often primary and of essential importance, and demands the chief attention of the practitioner. The following remarks deserve attention, referring as they do to a point which we believe to be more frequently overlooked than regarded, notwithstanding its almost vital importance in the treatment of what is called nervousness:

"These neurotic complaints are *physical*; they are in every way as much real diseases as those of organic life. They are irritations of the medullary matter of the brain, of the spinal cord, and of their radiations, the nerves; as truly as organic diseases, inflammations, fevers, &c., are irritations of the heart, arteries, capillaries, and organic cells. Since, therefore, the cerebrum is the organ of the mind, as well as of the body, and mental and moral causes may give origin to nervous diseases, and since remedies of an intellectual and moral character contribute to recovery in nervous affections; it is unscientific, as well as unjust and cruel, to maintain that such diseases are mental or moral, a perversion of the 'intellect or the heart,' that they are 'imaginary,' a 'mere notion,' that the patient is 'affected,' wishes to be 'interesting,' to attract 'attention,' 'has a bad temper,' and that she would recover 'if she made the effort,' if she were 'forced to work,' and such other uncharitable suggestions. Let it be remembered that the business of the physician is with



surplus population of chronic cases, with which they are burdened, and he proposes four modes in which it may be accomplished:—

I. By placing patients who are greatly improved and inoffensive in their own families, under an official superintendence, exercised under the form of pecuniary aid and moral and medical advice.

II. By placing certain cases selected by the physician in the houses of peasants, or others, in the vicinity and under the superintendence of the medical officers of asylums.

III. By attempting the formation of a new Gheel, that is to say, a village of the insane, with a regular central organization, an earnest medical staff, and an hospital; with the express conditions, however, that there shall be received chronic cases only; and that there shall be excluded the excited, the dangerous, and those under treatment.

IV. By connecting with an asylum a farm, where patients would be received directly from, and, if necessary, sent back to the asylum, according to the opinion of the medical officer.

We may resume consideration of M. Falret's exhaustive report when we receive that which may be expected to emanate from the Committee of the Society of Medical Officers connected with Asylums. The spirit of the criticism appears liberal and impartial; but it is noteworthy that, whether M. Falret be infected with Anglophobia or not, he ignores altogether the examination of Gheel by English observers, and their opinions.

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## EARL STANHOPE'S ACCOUNT OF THE MENTAL MALADY OF GEORGE III.

The following highly graphic account of the mental disorder which afflicted George III. in 1788, 1801, and 1804, is from the recently published Life of William Pitt, by Earl Stanhope:—

1788.—"The constitution of George III. was by nature hardy and robust; but with a constant tendency to corpulence. To counteract this the King had from an early period adopted a system of abstemious diet and of active exercise. While his meals were of the simplest and plainest kind, the equerries in attendance upon him might often complain of the great distances which he rode in hunting, or of his walks of three hours before breakfast. This system carried to excess, combined with never-failing and anxious attention to affairs of state, was the cause of the mental malady in 1788. Such, at least, was the opinion of the case expressed by Dr. Willis, the ablest by far of his physicians, when examined by the Committees of the House of Lords and House of Commons.

"Early in the summer of 1788 the King's health suffered from repeated bilious attacks. In a letter to Mr. Pitt he says of himself that he is certainly 'a cup too low.' His physicians prescribed the waters of Cheltenham, and on the 12th of July, the day after the prorogation, he set out with the Queen for that place. A sojourn of several weeks failed, however, to yield him the expected benefit. When he returned, first to Kew, and afterwards to Windsor, he seemed weaker in body than before. His attendants were surprised and

grieved at seeing him, so lately the most athletic of pedestrians, require the support of a stick. 'I could not,' he said, 'get on without it; my strength seems diminishing hourly.' 'My dear Effy'—thus he accosted one of the Queen's ladies, the Dowager Countess of Effingham—'you see me at once an old man!'

"Yet still, in some points at least, the King's active habits were maintained. Mr. Rose reports that 'Mr. Pitt saw him at Kew, and was with him three hours and forty minutes, both on their legs the whole time.' And this brings us to a peculiarity in the reign of George III. It was the invariable or almost invariable custom of that monarch to confer with his ministers standing, neither himself to sit down nor ask them to be seated. This rule, so highly inconvenient to both parties, was no doubt derived from some of the Continental Courts.

"At this period of October, 1788, the only physician in attendance on the King was Sir George Baker. He states in his evidence before the subsequent committees, that the first time when he conceived any suspicion of a mental malady in the King, was in the evening of the 22nd of October. Next morning the unfavourable symptoms which led to that suspicion had wholly disappeared.

"On the 24th, however, the King made an effort beyond his strength, in going to hold a levee at St. James's. He made that effort, as he wrote to Mr. Pitt, 'to stop further lies, and any fall of the Stocks.' But at the levee his manner and conversation were such as to cause the most painful uneasiness in several at least of those to whom he spoke. Mr. Pitt, in particular, could not entirely suppress his emotion when he attended the King in his closet after the levee, which His Majesty observed and noticed with kindness in writing next day to his minister from Kew. Probably conscious himself, at least in some degree, of his coming malady, he directed Mr. Pitt, in the same letter, not to allow any political papers to be sent to him before the next ensuing levee.

"On the 29th the King removed to Windsor Castle. His state appears to have fluctuated from day to day; but there was no lasting improvement in his health. His letters to Mr. Pitt, which I shall give at length in my appendix, bear no tokens of an incoherent mind. They merely manifest some reluctance and anxiety as to the measures which Pitt desired to pursue with regard to the Northern Powers. The last letter of the King before his malady is dated on the 3rd of November. In this His Majesty states that he can now sign warrants in any number without inconvenience. He adds, that he attempts reading the despatches daily, but as yet without success.

"Of the King's real condition at this time, by far the best, and indeed, so far as published, the only good account, is to be found in the private journal of Miss Frances Burney, the accomplished author of 'Evelina.' That lady was now a member of the royal household, and in daily attendance on the Queen as, under Mrs. Schwellenberg, Deputy Keeper of the Robes. Dull and trifling as the earlier volumes of her 'Diary,' I must confess, appear to me, the entries in it now become of lively interest and of sterling value, and are marked by not merely dutiful, but warm and affectionate attachment to her Royal Mistress.

"By some extracts from her journal my narrative may be best continued:—

"'*Sunday, November 3.*—We are all here in a most uneasy state. The King is better and worse so frequently, and changes so daily backward and forward, that everything is to be apprehended if his nerves are not someway quieted. I dreadfully fear he is on the eve of some severe fever. The Queen is almost overpowered with some secret terror. I am affected beyond all expression in her presence to see what struggles she makes to support serenity. To-day she gave up the conflict when I was alone with her, and burst into a violent fit of tears. It was very, very terrible to see!

"'*Wednesday, November 5.*—I found my poor royal mistress in the morning sad and sadder still; something horrible seemed impending; and I saw her whole resource was in religion. We had talked lately much upon solemn subjects; and she appeared already preparing herself to be resigned for whatever might happen.

"'At noon the King went out in his chaise with the Princess Royal for an airing. I looked from my window to see him; he was all smiling benignity, but gave so many orders to the postilions, and got in and out of the carriage twice with such agitation, that again my fear of a great fever hanging over him grew more and more powerful. Alas! how little did I imagine I should see him no more for so long—so black a period!

"'When I went to my poor Queen, I found her spirits still worse and worse . . . . The Princess Royal soon returned. She came in cheerfully, and gave in German, a history of the airing, and one that seemed comforting.

"'Soon after suddenly arrived the Prince of Wales. He came into the room. He had just quitted Brighthelmstone. Something passing within seemed to render this meeting awfully distant on both sides. She asked if he should not return to Brighthelmstone. He answered, 'Yes; the next day.' He desired to speak with her; they retired together.'"

"This day, the 5th of November, of which Miss Burney has thus described the earlier portion, proved to be the first of the King's disorder, when its real nature could be no longer mistaken or concealed. For that afternoon the King, at dinner with the Royal Family, broke forth into positive delirium, and the Queen was so overpowered as to fall into violent hysterics.

"Next morning, the 6th, when Miss Burney rose, she found that the equerries and gentlemen in attendance had sat up next his chamber door all night, and there were likewise all the pages dispersed in the passages and anterooms; 'and oh,' she adds, 'what horror in every face I met!'

"Besides Sir George Baker, who continued in close attendance, a physician of the highest eminence—Dr. Warren—had been sent for by express. When, however, he came, the King positively refused to see him. 'This was terrible,' writes Miss Burney. 'But the King was never so despotic; no one dared oppose him. He would not listen to a word, though when unopposed he was still all gentleness and benignity to every one around him . . . . He kept talking unceasingly; although his voice was so lost in hoarseness and weakness it was rendered almost inarticulate.'

"Expresses had of course gone up also to Mr. Pitt. His grief may be easily imagined; but his anxiety was not less than his grief. He saw at once the difficulties that rose before him in the event that the King's reason should continue clouded, and yet his life be spared. In such a case there were strong grounds for imposing some restrictions on a Regency. Yet how could such restrictions be imposed unless by Act of Parliament? and how could any Act of Parliament be passed without a King to give his assent? Thus, in one sense, a limited Regency seemed requisite, while in another sense it seemed impossible.

"Pitt, however, applied himself at once to all the measures in his power. This same afternoon he sent expresses to summon the cabinet ministers who were absent from town. Here is his letter to the Marquis of Stafford, Lord Privy Seal.

Grosvenor Square, *Nov. 6*, 1788, 6 P.M.

"My dear Lord,—I write from Lord Carmarthen's, having just heard an account from Windsor, by which I learn that the King's disorder, which has for some days given us much uneasiness, has within a few hours taken so serious a turn, that I think myself obliged to lose no time in apprising your lordship of it.

"The accounts are sent under considerable alarm, and therefore do not state the symptoms very precisely; but from what I learn, there is too much reason to fear that they proceed from a fever, which has settled on the brain, and which may produce immediate danger to his Majesty's life. You will easily conceive the pain

I suffer in being obliged to send your lordship this intelligence; but as you may possibly think it right, under such circumstances, to be on the spot as soon as possible, I thought no time should be lost in letting you know the situation.

"I am, with great regard, &c.,

"W. PITT."

"On the same day Pitt also wrote to the Bishop of Lincoln, at Buckden Palace, and here is the extract from his letter which the Bishop gives:—

"The effect most to be dreaded is on the understanding. If this lasts beyond a certain time, it will produce the most difficult and delicate crisis imaginable, in making provision for the Government to go on. It must, however, be yet some weeks before that can require decision; but the interval will be a truly anxious one. You shall hear again soon; but if in the course of a few days you could spare the time to come to town, I should be very glad to talk with you, as there will be a thousand particulars you must wish to know, which I cannot write. I shall not stir from hence, except for going to inquire at Windsor."

The Bishop adds:—

"I went to town immediately, and late at night found Mr. Pitt expecting a messenger every moment with the account of the King's death; but the intelligence, which did not arrive till two in the morning, proved more favourable."

"During the night which followed there were many anxious watchers in the apartment next to the Royal sufferer's. The Prince of Wales, the Duke of York, the physicians, and the gentlemen of the royal household, sat on chairs and lay on sofas round the room. All were in dead silence, and amidst the partial darkness the two princes were still to be distinguished by their stars.

"Next day, 7th of November, towards seven in the morning, when the Queen was already dressed, but Miss Burney was still attending her, the Prince of Wales came hastily into Her Majesty's chamber, and then, in Miss Burney's presence, gave 'a very energetic history' of the preceding night. The King had risen some hours before daylight, and insisted on walking into the next apartment. There he was utterly amazed at finding, instead of the mere solitude which he expected, the large assemblage of his family and household. With some haste, he demanded what they all did there. Sir George Baker was exhorted in whispers by the gentlemen near him, and even, it would seem, by the Prince of Wales, to lead the King back to his chamber; but he had not courage, and he seems, indeed, to have well deserved the character which the King presently gave him, when His Majesty pinned him in a corner and told him he was only an old woman. No one else dared approach his Majesty, and this most painful scene continued a considerable time. At length the Queen's Vice-Chamberlain, Colonel Stephen Digby, an old servant of their Majesties, resolved to act. He went boldly up, and taking the King by the arm, entreated him to go to bed; but finding entreaties in vain, began to draw his Majesty along, and to say he must go. 'I will not,' cried the King, 'I will not! Who are you?' 'I am Colonel Digby, sir,' he answered, 'and your Majesty has been very good to me, and now I am going to be very good to you; for you must come to bed, sir—it is necessary to your life.' And then, continued the Prince of Wales in his narrative, the King was so surprised that he allowed himself to be drawn along as gently as a child, and thus was he brought back to his chamber.

"Hear, then, was the turning-point. This was the precise moment when ceased the dominion of a sovereign over his subjects, and when began, on the contrary, the dominion of sound minds over an unsound one. Here, then, let history pause. So long as the King continued a public character, it is her right and her duty to record his course; not so to explore the dismal secrets of his enforced and lonely sickroom.

"It may therefore suffice to say, in general terms, that during the next few days the King became greatly worse, both in mind and body. Not only seemed his reason lost, but his life in imminent danger. Then, in those hours of suspense and anguish at Windsor, came to light some further revelations of his growing malady. The Queen had sent for Dr. Warren, soon after his first arrival, and felt it her duty to inform him privately that for some time past she had more than suspected the real situation of the King. The Duke of York had met the King on Monday the 3rd, after his Majesty had been on horseback for some hours, and the King, drawing his son aside, had burst into tears and given utterance to the simple, but most affecting words, 'I wish to God I might die, for I am going mad!'

"The physicians in daily attendance—and within a fortnight their number had been increased to four—were of course guarded and cautious in their expressed opinions. But among the members of the royal household the belief was most strongly prevalent that there was little or no prospect of the King's recovery. The Queen withdrew to her own chamber, and passed the whole day in patient sorrow with her daughters. The entire direction of the household devolved upon the Prince of Wales, and nothing at Windsor was done but by direction of his royal highness.

"So great and awful an affliction, and so deep a responsibility resulting from it, could not fail to impress even the least earnest minds.

"'The Prince was frightened, and was blooded yesterday.' So wrote one of the Grenville cousins who was at Windsor on the 7th.* * * *

"Meanwhile the illness of the King and its real nature could not be kept secret. The tidings of it flew far and wide throughout the country, everywhere exciting the utmost sympathy and sorrow. Then did it become apparent how strong and deeply rooted was in truth at this period the popularity of George the Third, and how thoroughly had passed away from it the clouds of earlier years. By the Queen's direction, Colonel Digby had written to the Archbishop of Canterbury, suggesting that there should be offered up public prayers for the King's recovery. A form of prayer was accordingly framed at Lambeth Palace, and ordered to be used in all the churches, and the manner in which the various congregations through the kingdom joined in this act of worship clearly evinced the sincerity and the strength of their affliction.

"Other manifestations of the same feeling were not all as commendable. Thus the physicians in attendance on the King received every day a number of threatening letters to answer for the safety of their monarch with their lives. On one occasion, Sir George Baker was stopped in his carriage by the mob, and required to give an account of the King's state. Poor Sir George faltered out that it was a bad one; on which there arose a furious cry: 'The more shame for you!'† * * *

"Soon afterwards a case of much difficulty arose at Windsor. There was a strong and just desire to remove his Majesty to Kew. In the first place the distance of Windsor from London was most inconvenient to the physicians in attendance; secondly, and this was the main if not the only reason put forward by themselves, it was most essential that the King should have, as he might have at Kew and could not at Windsor, a private garden, where, whenever his health permitted, he might take exercise without being overlooked or observed. But, on the other hand, the King showed the most extreme repugnance to leave Windsor. It was thought that even in his distracted state the advice of his confidential servants would have weight with him, and the necessity of compulsion be thus avoided. Accordingly, on the 28th, a privy council was held at Windsor, when the physicians were formally examined, all agreeing that the removal of his Majesty to Kew was a point of most pressing importance.

* Vol. i., pp. 383—392.

† Vol. i., p. 393.

"For the scene that followed, as for some of the preceding, I adopt the graphic description of Miss Burney:—

'Inexpressible was the alarm of every one lest the King, if he recovered, should bear a lasting resentment against the authors and promoters of this journey. To give it therefore every possible sanction, it was decreed that he should be seen both by the Chancellor and Mr. Pitt. The Chancellor went into his presence with a tremor such as before he had been only accustomed to inspire, and when he came out he was so extremely affected by the state in which he saw his royal master and patron, that the tears ran down his cheeks, and his feet had difficulty to support him. Mr. Pitt was more composed, but expressed his grief with so much respect and attachment, that it added new weight to the universal admiration with which he is here beheld.'

"But whatever may have passed at these most painful interviews, it was found that they had not surmounted the morbid aversion of the King to the change required. 'In what a situation was the house!' exclaims Miss Burney; 'princes, equerries, physicians, pages—all conferring, whispering, plotting, and caballing how to induce the King to set off!' Recourse was now had to a no less painful stratagem. The King had for some time been most earnestly pressing to see the Queen and the Princesses, but this the Physicians had deemed it necessary to refuse him. It was then decided that the royal ladies should proceed early next morning to Kew; that the King should be informed of their departure by the physicians: and that if, as they expected, he should doubt their assertion, he might be suffered to go through the apartments and ascertain the fact for himself. Next a promise was to be made his Majesty that on rejoining the members of his family at Kew he should be permitted to see them. On this promise George III did consent to the journey, and it did take place. But on coming to Kew the promise under which he had acted was not fulfilled; and the result—as might surely have been foreseen—was that same night a paroxysm of much increased severity.* * * *

"On the 4th of December the Parliament met in most anxious expectation. Mr. Pitt in the one house, and Lord Camden in the other, laid upon the table the Report of the Examination [of the physicians attending the King] before the Privy Council, and moved that it should be taken into consideration on the 8th. At the same time the Prime Minister gave notice that he should propose the appointment of a committee to search for precedents. Mr. Fox suggested a doubt (as Mr. Vyner had before him) whether it was quite consistent with the dignity of Parliament to make a report from the Privy Council the groundwork of their proceedings on a question of such extreme importance. Pitt declared that he was anxious to afford the most ample information, but pointed out that the Privy Council could take evidence upon oath, which a Committee of the Commons could not.

"Meanwhile it had become apparent to the small circle of the King's confidential servants, that, eminent as were the physicians in attendance, they had up to this time altogether failed in effecting any mitigation of his symptoms. Might not greater benefit follow from the treatment of some one who had more specially applied himself to the cure of mental maladies? Foremost among such practitioners in public fame stood Dr. Francis Willis, a clergyman and Rector of Wapping. By a somewhat unusual combination of duties he had, during twenty-eight years, kept an asylum for insane persons at his residence in Lincolnshire. His name was first brought forward by Mrs. Harcourt, the wife of one of the equerries, General, afterwards Earl, Harcourt. She drew up a paper stating her knowledge of his merits from his successful treatment of her mother. On the 28th of November, this paper being laid before the Prince, the Duke of York, the Chancellor, and Pitt, it was determined that Willis

* Vol. i., p. 398.



should be sent for. Accordingly he was summoned by express to Kew. He came accompanied by his two sons, one of whom, Dr. John Willis, was a professed physician; and on the 5th of December he had his first interview with the royal sufferer.

"From the first Dr. Willis formed a highly favourable opinion of the case. 'Had I been consulted in the first instance,' he frankly said, 'his Majesty's illness would have been of very short duration.' He adopted at once a different course of treatment. He laid aside all false pretences, all petty vexations, all unnecessary restraints. He thought that in this case no violence need be apprehended, and that no suspicion should be shown. The King had been denied a razor at his toilet, and a knife and fork at his table. These were at once restored to him, and in Dr. Willis's presence were freely used. The good effects of this altered treatment speedily appeared. As yet the delusions continued unabated, but far greater calmness and composure, as also better health, were attained.

"Under these circumstances both the Queen and Mr. Pitt were disposed to place great confidence in Dr. Willis. He was considered as mainly responsible for the conduct of the case. Taking up his residence with his sons in the palace at Kew, he had the constant care of the King's person, while the other physicians only paid their visits by rotation and at stated times.

On the 8th, at the next meeting of the House, Pitt adverted to the suggestions which had been made of appointing a Parliamentary Committee to examine the physicians, and declared himself willing to accede to it, observing that there was now a stronger reason for it than at the last debate, since some new physicians had been recently called in. Accordingly there was named, with general assent, a committee of twenty-one, comprising the most distinguished members from both sides. A similar motion was made and carried in the Lords, and each committee completed its examination in a single day. All the physicians, in their evidence, agreed that there were good hopes of the King's recovery, but that no probable period for it could be named. Yet the degree of these hopes was not the same in all, and here again party spirit crept in. Dr. Warren was closely connected with Fox and Fox's friends, and it was observed that his prognostics were far less sanguine than those of Dr. Willis. Thus the names of these two physicians became, as it were, watchwords on each side; the Ministerial party relying on the special experience of Willis, while the Opposition party might allege the high authority of Warren.

"On the 10th of December Mr. Pitt presented to the House the Report of these examinations, and observed that the King's present incapacity for business having now been ascertained by a committee of their own members, he should proceed according to his notice, and move that another committee be appointed to search for precedents.* . . . .

"The Regency Bill finally passed the House of Commons on the 12th of February. On the 17th and 18th the Peers discussed it in Committee. The third reading was close impending, and the Chancellor was ready to give immediately afterward the substitute for the Royal Assent.

"But a change was now at hand in the King's health. On the 2nd of February Miss Burney met the King by accident for the first time since the 5th of November. He was walking in Kew Gardens between the two Doctors Willis, and engaged her in conversation for a considerable time. She observed some wildness in his eyes, and a great deal of incoherence in his language. From the 6th the improvement grew rapid and decided. Dr. Willis, who was in daily communication with Mr. Pitt, declared himself clearly of opinion that after a short period no part of His Majesty's mental disorder would remain. For some time Dr. Warren was reluctant to acknowledge any real improvement

* Vol. ii., p. 8, et seq. 1789.

in the face of his gloomy predictions. But ere long he was overpowered by the force of facts. The public bulletin of the 12th of February mentioned 'progressive amendment,' and that of the 17th 'a state of convalescence.'

"Still Pitt and Lord Thurlow, feeling the magnitude of the point at issue, hesitated. But Dr. Willis was clear in his own opinion. He sought an interview with Lord Thurlow, and repeated that opinion in the strongest terms. As the story was afterwards told by one of his sons, Dr. Willis actually 'bullied' the Chancellor before he could make him stir in the matter.

"On the 19th, however, a Cabinet was held, and in consequence of the decision which was there adopted, the Chancellor, that same evening, rose in the House of Lords, and announcing the auspicious news, proposed that the Committee on the Regency Bill should be put off till the 23rd. 'And,' Miss Burney adds, 'this evening, for the first time, the King came upstairs to drink tea with the Queen and Princesses in the drawing-room. Huzza! huzza!'

"On that afternoon also Pitt wrote to his mother, after several weeks of silence, to give her the good news:—

"My dear Mother, "Thursday, Feb. 19, 1789."

"You will have seen for some days how constantly the news from Kew has been improving. The public account this morning is that the King continues advancing in recovery. The private one is that he is, to all appearance, perfectly well, and if it were the case of a private man, would be immediately declared so. It remains only to consider how far he can bear the impression of the state of public business; but, in consequence of these circumstances, the Bill will probably be postponed in the House of Lords to-day till Monday; and if the prospect is then confirmed, the plan of the Regency must probably be altered with a view to a very short interval indeed, or perhaps wholly laid aside. This intelligence will be welcome enough to excuse a short letter, and I could not resist the pleasure of communicating it, though not in a moment, as you may imagine, of much more leisure than even for some time past under different circumstances.

"Ever, my dear Mother, &c.,
"W. Pitt."

"On the 20th the Chancellor went himself to Kew, and had an interview of an hour and a quarter with the King. He was with his Majesty again on the 22nd, and reported to Pitt that he never at any period had seen him more composed, collected, and distinct. 'On the 23rd,'—thus writes Mr. Grenville to his brother at Dublin Castle,—'the two Princes were at Kew, and saw the King in the Queen's apartment. She was present the whole time, a precaution for which, God knows, there was but too much reason. They kept him waiting a considerable time before they arrived, and after they left him drove immediately to Mrs. Armistead's, in Park Street, in hopes of finding Fox there, to give him an account of what had passed.'

"Later on the same day, the 23rd, the King wrote his first letter since his illness to Pitt; an excellent letter, as Wilberforce, to whom it was shown in confidence, calls it in his diary. On the morrow ensued the first interview between the Monarch and the Minister. Pitt, on his return from Kew, called upon Grenville, and gave him, in perfect unreserve, an account of what had passed. 'I was with the King,' he said, 'above an hour this morning. There was not the smallest trace or appearance of any disorder. His manner was unusually composed and dignified; but there was no other difference whatever from what I had been used to see. The King spoke of his disorder as of a thing past, and which had left no other impression on his mind than that of gratitude for his recovery, and a sense of what he owed to those who had stood by him. He spoke of these in such a manner as brought tears into his eyes; but with that degree of affection of mind there was not the least appearance of his disorder. After I had left his Majesty, I conversed with Willis, who told me that he now thought the King quite well; that he could not perceive the least trace remaining of his malady.'* * * *

"In the summer, the King, being advised to confirm his health by some seabathing, went to Weymouth, accompanied by the Queen and Princesses. His mode of life upon the coast is thus described:—'He usually rises at six, walks the Parade till eight, takes breakfast before ten, rides till three, dines at four, and resumes the promenade with the Queen and Princesses till late in the evening, provided the weather be fine. Sometimes the scene was varied by a sailing party on the sea, or an excursion inland; and their Majesties visited both Exeter and Plymouth before they returned to Windsor.'† * * *

1801.—"In the middle of February the King fell ill. His illness was at first no more than a feverish cold. On the 17th he saw Mr. Addington, and on the 18th he saw the Duke of Portland. With the latter he talked very calmly on the general aspect of State affairs. 'For myself,' said his Majesty, 'I am an old Whig; and I consider those statesmen who made barrier-treaties and conducted the ten last years of the Succession War the ablest we ever had.' The Duke only noticed as unusual that the King spoke in a loud tone of voice. But it is remarkable in this conversation that George III. discerned, what since his time has become much more apparent, how, not by any sudden change, but by the gradual progress of events, the Whig party has drifted away from its first position in the reign of Queen Anne, and come round to occupy the original ground of its opponents.

"The King's calmness in this interview did not long continue. A most grievous calamity was now impending over him from all the agitation and anxiety which he had just sustained. After an interval of twelve years his mind was once more deranged. The Duke of Portland was with him again on the 20th, and was then extremely alarmed. Next day, that is, on Saturday the 21st, the mental alienation was plainly manifested. On the Sunday Mr. Addington was for a short time admitted to his chamber, and afterwards reported to Mr. Pitt that he had found the King collected on some points, but wandering on others. Unhappily the symptoms, instead of diminishing, increased, and became at last not less acute than in 1788.

"It is said that one of the earliest symptoms which the King publicly showed of his mental affliction was in Chapel, and it may have been on this very Sunday. He repeated in a loud voice, and with extraordinary emphasis, as though referring to his own accession, in 1760, the well-known verse in the Morning Service: 'Forty years long was I grieved with this generation, and said: It is a people that do err in their hearts, for they have not known MY ways.'

"On the Monday the King was for many hours without speaking, and, it would seem, unconscious of what passed around him. Towards the evening he came to himself, and then said, 'I am better now, but I will remain true to the Church.' Thus at every intermission of his malady his mind at once reverted to the first cause of his distress. By an order of the Privy Council, public prayers were offered up for his Majesty's recovery, and the three Doctors Willis were summoned to his aid.

"On Tuesday, the 24th, however, Lord Loughborough, as still holding the Great Seal, thought himself justified by the public exigency in going to Buckingham Palace and obtaining the King's signature to a Commission for giving the Royal Assent to an Act of Parliament. That Act was for the repeal of the Brown Bread Bill, which, as I have elsewhere shown, was passed in haste at the close of the preceding year, and which had been found very mischievous in practice. There is no doubt that all parties now concurred in

* Vol. ii. p. 24 et seq. † Vol. ii. p. 37.

desiring its repeal, and that a delay of that repeal would have been injurious; yet even this consideration scarcely suffices to vindicate the course which, under such circumstances, the Chancellor pursued. On returning from the Palace, his Lordship said that when he had carried the Brown Bread Act to the King, his Majesty was in the possession of his understanding. But this was only his Lordship's public declaration. To Mr. Rose, as to a private friend, he owned that he had not seen the King at all. He had sent in the Commission to his Majesty by Dr. Willis, who brought it back signed, and told him that there would be no difficulty in obtaining the Royal signature to a dozen papers respecting which no detailed statements were necessary.

"During many days the King's malady did not abate. During many days he was unable to see his Ministers, either the late or the new, or even the Queen and the Princesses. Meanwhile the Government was in a most anomalous, nay, unprecedented state. Here was one Cabinet in progress of formation, and sanctioned by the King. Here was another Cabinet which had resigned; but still holding the seals of office, and alone competent to do any official act. Here was Mr. Addington, Prime Minister *de jure*. Here was Mr. Pitt Prime Minister *de facto*. It was only by the entire cordiality at this time between the two statesmen that confusion was avoided. They held several familiar conferences on the painful, but, as it seemed, unavoidable and close-impending question of a Regency.* * * *

"On the 2nd of March there was a crisis in the King's disorder. His Majesty was so ill that his life was almost despaired of; but having sunk into sleep, which continued for some hours, he awoke much refreshed, and from that time steadily mended. 'On the whole,' says Mr. Rose in his journal of the 3rd, 'the alteration for the better appeared to be most extraordinary. The King was thought so well that the Queen and the Princesses took an airing in their carriages. This account was brought to Mr. Pitt, while in bed, before eight o'clock, by Mr. Addington. . . . . Mr. Addington came again to Mr. Pitt late in the day, when I was with him, and said the accounts from the Queen's House continued as favourable as possible.'

"During the next two days the King's health continued, though slowly, to improve. Nevertheless, on the 5th Pitt felt it necessary to consider seriously with his Treasury intimates how far it would be possible to prolong the *later-regnum*. It was absolutely requisite to obtain, without much further delay, the Royal sanction to the foreign despatches, and the Royal assent to the Parliamentary Bills. Pitt came to the conclusion that unless his Majesty should be quite well before the 12th, that was the latest day to which he could defer an examination of the physicians either before the Privy Council or the House of Commons. In that case a Regency Bill might be brought in on the 14th, and might pass by the 23rd. This was on the supposition that it would be unopposed. And Mr. Pitt thought that it would not be safe to defer the inquiry of the physicians even till the 12th, unless it could be ascertained that no delay would be created.

"All questions of Regency, however, were set at rest by the King's convalescence. It is remarkable that the first favourable change was due to Mr. Addington, not, indeed, in his political, but rather in his filial capacity. He remembered to have heard from his father, the eminent physician, that a pillow filled with hops would sometimes induce sleep when all other remedies had failed; and the experiment, being tried upon the King, was attended with complete success. Some persons have supposed that a rumour of this fortunate prescription gave rise to the nickname of 'The Doctor,' which, some months later, was almost universally applied to Mr. Addington; but I doubt whether

* Vol. iii. p. 292 et seq.



the report was ever so prevalent as to produce that popular taunt, which was only, I conceive, a reminiscence of his father's profession.

"On Friday, the 6th of March, the King, though much reduced in strength, was clear and calm in mind. He sat for some time with the Queen and the Princesses. He desired Dr. Thomas Willis to write an account of his convalescence to Mr. Addington, to Lord Eldon, and to Mr. Pitt. With respect to Mr. Pitt, his Majesty used the following words:—'Tell him I am now quite well—quite recovered from my illness; but what has *he* not to answer for who is the cause of my having been ill at all?' [Referring to Mr. Pitt's conduct on the Catholic Question.]

"Pitt was deeply affected. It had given to him and to his colleagues, who were retiring from the Cabinet, most heartfelt pain to find that their conscientious course of duty had been the means of bringing upon their Royal Master this heavy and unforeseen affliction. Lord Malmesbury has an entry as follows in his journal, under the date of the 25th of February:—'Lord Spencer very much hurt at what has passed, and feeling a great deal for the share he has had in it; and Pitt, though too haughty to confess it, feels also a great deal.'* * * *

1804.—"On the 12th or 13th of February, Lord Malmesbury states, the King (after having taken cold by remaining in wet clothes longer than should be) had symptoms of the gout. He could not attend on the Queen's birthday, though he appeared in the evening at an assembly at the Queen's House; he was too lame to walk without a cane; and his manner struck me as so unusual and incoherent, that I could not help remarking it to Lord Pelham, who, the next day (for I went away early) told me that he had, in consequence of my remark, attended to it, and that it was too plain the King was beginning to be unwell. Lord Pelham, who played that evening with the Queen, added that her anxiety was manifest, since she never kept her eyes off the King during the whole time the party lasted.

"The King was at first attended only by his household physician. He had conceived a strong dislike to the Doctors Willis, from the treatment which they had found requisite in his malady three years before—a feeling very frequent with persons in that afflicted condition. At his urgent request, as his illness increased, another physician, Dr. Symonds, was called in. For two days his Majesty's life was in danger, and for at least a week the derangement of his mind was complete. By degrees he began to rally, but more slowly and with a greater tendency to relapse than either in 1789 or 1801."† * * *

In May the mental state of the King continued to be a matter of anxiety. Mr. Pitt noticed some increase of agitation on the 10th and later in the month.

"The Duke [of Portland] told Lord Malmesbury that he had little doubt of the King doing well. Quiet would set him right, and nothing else. Not quite so sanguine was Mrs. Harcourt, who came to see Lord Malmesbury the next day. She said that the King was apparently quite well, when speaking to his ministers, or to those who kept him a little in awe, but that to his family and dependents his language was incoherent and harsh, quite unlike his usual character. He had made capricious changes everywhere, from the Lord Chamberlain to the grooms and footmen. He had turned away the Queen's favourite coachman, made footmen grooms, and *vice-versâ*; and, what was still worse, because more notorious, had removed Lords of the Bedchamber without a shadow of reason. All this, said Mrs. Harcourt, afflicts the Royal Family beyond measure. The Princesses are quite sinking under it.

"The 27th of May, on which Lord Malmesbury wrote these last entries in his journal, supplied another proof that even a mere trifle might still throw the King's mind from off its balance. Going down to Windsor on the 26th, his

* Vol. iii. p. 302. † Vol. iv. p. 119.

carriage was followed some way, and loudly cheered, by a party of Eton boys. This had such an effect upon his Majesty, that when he met a different party of the boys next morning, he said to them, 'I have always been partial to your school. I have now the additional motive of gratitude for being so. In future I shall be an anti-Westminster.'

"Yet Mr. Rose, from whom we derive this story, declares that when on the 5th of June he attended a Council to kiss the King's hand, on his appointment—which was the first time he had seen his Majesty since his recovery—'the King spoke to me for about ten minutes, and I never saw him more entirely composed and collected; if anything, less hurried in his manner than usual.'* * * * *

1805, July 1.—"His Majesty was now suffering under a grievous calamity, the most grievous in this world perhaps, or second only to the mental aberrations which he had also undergone. He was beginning to lose his sight. One eye was almost entirely darkened, and the other grew less and less clear. There was a hope, but as it proved not well founded, that the advance of the cataract would leave scope hereafter for a successful operation. Meanwhile the King bore his distress with the greatest fortitude and resignation."† * * *

In a letter to Mr. Pitt, dated from Weymouth, August 26, 1804, the King says:—

"As to Mr. Pitt's inquiries as to the King's health, it is perfectly good, and the quiet of the place and salubrity of the air must daily increase his strength. By the advice of Sir Francis Milman who is here, the King will bathe in the tepid bath, in lieu of going into the open sea. His Majesty feels this a sacrifice, but will religiously stick to this advice, but does not admire the reasoning, as it is grounded on sixty-six being too far advanced in life for that remedy proving efficacious."‡

In September, Mr. Pitt, in the hope "that the experience of the past year might make the King less adverse to his counsels for an extended basis of administration," had an interview, of three hours' duration, with his Majesty, at Weymouth. He "urged anew, but quite in vain, all the arguments he could, stopping short only at the point when he feared lest he might disturb the health or the mind of his Royal Master."§

A day or two prior to this interview, the King addressed a brief note to Mr. Pitt, which terminated with the following remark:—"His Majesty's sight will not allow him to add more, as though he gains some ground, he can neither read what is written to him nor what he writes."

Towards the end of October, 1810, the King's mind became again disordered, and from this attack he never recovered, continuing in a state of mental incapacity until his death, which occurred at Windsor on the 29th January, 1820, in the eighty-second year of his age. "All history," touchingly says the author of the "Four Georges," "presents no sadder figure than that of the old man, blind and deprived of reason, wandering through the rooms of his palace, addressing imaginary parliaments, reviewing fancied troops, holding ghostly courts. I have seen his picture as it was taken at this time, hanging in the apartment of his daughter, the Landgravine of Hesse Hombourg—amidst books and Windsor furniture, and a hundred fond reminiscences of her English home. The poor old father is represented in a purple gown, his snowy beard falling over his breast—the star of his famous Order still idly shining on it. He was not only sightless: he became utterly deaf. All light, all reason all sound of human voices, all the pleasures of this world of God, were taken from him. Some slight lucid moments he had, in one of which the Queen, desiring to see

* Vol. iv. p. 194. † Vol. iv. p.
‡ Vol. iv. *Appendix*, p. xviii. § Vol. iv. p. 334.



him, entered the room, and found him singing a hymn, and accompanying himself on the harpsichord. When he had finished, he knelt down and prayed aloud for her, and then for his family, and then for the nation, concluding with a prayer for himself, that it might please God to avert his heavy calamity from him, but if not, to give him resignation to submit. He then burst into tears, and his reason again fled."

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## THE "ÆSTHETICS OF SUICIDE."

In the last number of the *American Journal of the Medical Sciences*, Dr. S. H. Dickson, Professor of the Practice of Medicine in Jefferson Medical College, Philadelphia, dissents (see Art. VI.) from the tendency of an article which appeared in the October number of this Journal under the title of "*The Æsthetics of Suicide*." Dr. Dickson erroneously attributes this article to the pen of the Editor; and the author is wishful to correct a misapprehension into which he thinks Dr. Dickson has fallen. He says:—

"Dr. Dickson objects that the article referred to is 'unjust and injurious in its pervading suggestion of a relationship assumed to exist between the suicidal disposition in the mind, and a moral degeneracy in the character. This assumption I believe to be entirely unfounded.' Dr. Dickson then cites several cases of suicide for the purpose of showing that suicide, 'however deeply to be deplored, however earnestly to be reprobated and forbidden, is not necessarily the result of any moral degeneracy, nor essentially associated with any imputation of vice or crime.' The latter proposition, I would remark, has no necessary connexion with the former, and I submit that the supposition upon which it is based forms no part of, and is not to be derived, except under misapprehension, from, an article, the object of which was intended to indicate in what manner, according to the author's opinion, a certain æsthetical method of treating suicide, in vogue in Europe, might, and most probably did, foster the act of self-murder. I had wished to convey the notion that this æstheticism of suicide was a highly influential cause *predisposing* to the commission of self-murder—an opinion which I believe is entirely in accordance with the views expressed by yourself [the Editor] in the 'Anatomy of Suicide,' and which is amply supported by the observations and conclusions of the most trustworthy and recent writers on the subject, as, for example, Brierre de Boismont and Lisle. I venture to suggest, indeed, that Dr. Dickson has misapprehended the object of my article so far as the immediate motives leading to the act of suicide are concerned. These, in fact, formed no part of my subject, which was limited to a consideration of certain of those circumstances which most tend to induce that state of mind in which the proximate causes, the immediate motives of suicide, prove influential in inducing the act. If the proximate,—the determining causes of suicide proved influential absolutely, without reference to some pre-existing mental state, instead of relatively with reference to such an assumed state, suicide would be the rule in ordinary life, and not the exception. That 'a moral degeneracy in the character' has a most important influence in fostering a disposition of mind favourable to the commission of suicide, by enfeebling the great moral checks to that act, and thus predisposing to self-murder, I undoubtedly hold; and the main object of my article was to show in what manner a class of literature, characterised in an especial way by an apotheosis of vice, contributed to this end. This question is of such great importance in reference to suicide, that I will ask your permission to deal with it again in the next number of the Journal—confining myself to such portions of my argument as I then omitted, partly from a desire not to intrude too much upon your space, partly from the belief that it was not necessary to state at large on what grounds I adopted certain primary assumptions which

had been long received, as I thought upon the most sufficient and conclusive data, by the best authors on the subject. In the meanwhile, however, unwilling that it should be supposed, by any doubting readers, for a moment longer than necessary, that the question of the relationship of vice and immorality to suicide is one of assumption only, I quote the following observations from Brierre de Boismont's great work on '*Suicide*,' (p. 87). Of 4595 cases of suicide examined by that authority, the *morality* was *good* in 1945, *bad* in 1454, *unknown* in 1196. Thus in upwards of *forty per cent.* (42·7) of the cases in which the actual moral condition was ascertained this was thus found to be bad, the individuals having been drunkards, gamblers, or thieves, or lived in concubinage or adultery. The drunkards formed a fourth part of this class, gamblers a sixty seventh, and thieves a seventieth; those who lived in adultery a nineteenth, and in concubinage a fifth. 'But,' observes M. B. de Boismont, 'the proportion of those individuals leading a regular life, and who have attempted to shorten their days, diminishes singularly, if it be recalled to mind that there are among them a considerable number of lunatics, weak-minded, and exalted spirits, hypochondriacs, sick, and persons reduced to poverty and misery. It is true then that the vices and passions exercise an unfavourable influence upon our acts and determinations, and that those who abandon themselves to them have in prospect poverty, a prison, sickness, insanity, and suicide.'

"M. B. de Boismont's observations and remarks refer to *overt* immorality; but do drunkenness, concubinage, adultery, gambling, and crime, include all the phases of a 'moral degeneracy of character?' Is not that state of mind equally a degeneracy, which, while inducing an individual to give due heed to all the conventional rules of morality, yet ignores and contemns those higher religious considerations which, I hold, alone makes a self-sought death an evil to which none experienced in this life can compare? Does not the philosophy of the great Stagirite shame many a Christian writer? 'The suicide,' he said, 'does not undergo death because it is honourable, but in order *to avoid a greater evil*.'"

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## NOTE ON QUARANTINE.

In the article on the Report of the Social Science Association Committee on Quarantine in our last number, it was erroneously stated that Dr. Bryson had not signed the Report. The author of the article, preoccupied with Dr. Bryson's dissentient opinions, had overlooked his name among the signatures attached to the Report, until his attention was called to the omission, of which he had unintentionally been guilty.

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## THE CASE OF MR. W. F. WINDHAM.

We had proposed in the present number of the Journal, to have laid before our readers a critical analysis of the Windham case in its medico-legal aspects. We are induced, however, as the most legitimate method to be adopted for a correct appreciation of the issues involved, and the most just course to be pursued to all parties concerned in this important case, to postpone its consideration until the legal proceedings still pending in connexion with it have terminated.



tinual momentary snatches of sleep during their night's labour. During the times of sugar-making very few allow them Sunday. They are most insufficiently clothed, and are fed upon such coarse salted meat and fish, that to this sameness of salt food, added to overwork, may be attributed many of the bad diseases of the skin to which they are subject. A slight scratch, particularly of the legs and feet, often turns into a most inveterate sore. *If there were not a constant supply from the coast of Africa the slave-population would rapidly diminish, and many sugar engenhos, in a very few years, be unable to continue their operations.*'

A few sentences will show that Brazil in the mean time has a fair supply. We copy part of a letter from a naval officer, dated West Coast of Africa, Oct. 9, 1847:—

'I have come to the conclusion that our trying to suppress the slave-trade is all nonsense. We have now five cruisers in the Bight of Benin, and within the last three months, to my certain knowledge, 4000 slaves have been taken over to Bahia safe and sound.

'Since the sugar-duty has been taken off, the demand for slaves in South America has been very extensive. We are keeping a large squadron for little or no purpose at all: the French cruisers are lukewarm in their exertions, and will be glad when the time arrives for their separation from England.

'The way the slave-merchants manage now as regards paying for the slaves is of course in goods, and those goods are principally English cottons, tobacco, and an inferior sort of spirit. These goods are brought over by chartered vessels, mostly under Sardinian colours, papers all right, backed by their consuls at Bahia—some French—and a few Americans, who are worse than all. Fast-sailing vessels come over, and in two hours ship their slaves and are off the coast. We have been rather lucky in taking four vessels (one with five hundred in): being a steamer, it has given us the advantage; sailing vessels stand very little chance; the slavers laugh at them.'

Such are already the effects of Lord John's measures of 1846.

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ART. VIII.—1. *Reports of the Commissioners for Pentonville Prison.* 1843-1847.

2. *Reports from the Committee of the Lords appointed to inquire into the Execution of the Criminal Law, especially respecting Juvenile Offenders and Transportation.* 1847.

3. *Prison Discipline.* By Rev. John Field, M.A. 1846.

4. *Traité des diverses Institutions Complémentaires du Régime Pénitentiaire.* Par M. Bonneville, Procureur du Roi. 1847.

OUR treatment of criminals is at this moment influenced by two theories, which are in their tendencies almost diametrically opposed to each other. 'The principal object of punishment,' says Mr. Baron Parke, 'I take to be the protection of society

society by deterring the offender from the repetition of his cr and others from following his example, by the pain and inc nience he sustains;' and the same opinion is maintained by all, if not by all, this eminent judge's brethren not only English but also of the Scotch and Irish Benches at thi By these authorities—weighty and grave ones it will be o amendment is considered as secondary, and to be looked as it may aid in the further diminution of crime. On th hand, the reformation of the culprit is the primary object view of Lord Brougham, of Mr. Hill (the Recorder of Bir ham), and numerous reasoners—some of whom have come to conclusion on *à priori* grounds, others on the alleged failure the system of 'repression.'

It is of great importance that the public should have definite notions on these antagonised principles, so as to ascertain whither, if fairly carried into practice, each will lead us. The 'deterrent' acts on the passion of fear in its various aspects of disgrace, shame, and corporal pain—a passion supplying some of the strongest motives to the will. The opposed principle is simply and strictly educational—willing to inflict no more pain than is absolutely necessary to further the conversion of the individual, and postponing even this modicum to such other means as may effect that end without its aid. Under this system our gaols are to become so many schools, where the only punishment, using the term in its ordinary acceptation, is about as much bodily restraint as is enforced in many of our own scholastic institutions—and much less than that submitted to in the monasteries and convents of other countries.

The contrast of the theories is brought out strikingly in the answers to the Committee on Criminal Law—

'I hold,' says Lord Denman, 'the only legitimate end of punishment to be to deter from crime. But I think I perceive in some of the theories of benevolent men such a mode of administering the criminal law as to encourage instead of deterring.'

'By a reformatory system,' says Mr. Hill, 'we understand one in which *all* the pain endured strictly arises from the means necessary to effect a moral cure. *A prison becomes an hospital for moral diseases.* The prisoner may be called a patient, while the various officers of the prison will gradually attain the position in his mind of persons exercising the healing art, and be no longer regarded as the agents of *vindictive power.*'

While we entertain some doubts as to the existence of any mental process which shall gradually confound a warder in the prisoner's estimation with a doctor, we can have none as to the rashness of expressions which invest the statutes at large with the



the caprice and the malice of unchastised passion. Legalized punishments may or may not be too severe; but in what sense is criminal law *vindictive?*—of what vindictive power is the turnkey the agent? Surely a vindictive Criminal Statute is as much a figure of speech as a hard-hearted treadmill. Burke did not fear to brand with stern censure the 'loose comparisons' and 'gross discriminations' of his day in the use of such terms as 'the *poor* labourer,' or the '*poor* soldier'—as if the very foundations of the social structure did not demand this condition in both classes of men. In our own times as much notice is demanded by the currency of phrases which tend to weaken the hands of justice and fling into its scale a bias of false philanthropy. Such cant might at least be left to the melodramatist and the novelist of congenial fibre.

We have just seen it broadly stated that to punish for the purpose of deterring is not admissible save only as accessary and incidental. The general question therefore is mooted—whether or no punishment be just? We know how complete a form the argument has assumed as relates to the pain of death, and it cannot be doubted that the effect of it has reached the category of secondary punishments also. But, in spite of these new theories, is it the fact that the mind and conscience of our nature have been changed; is it no longer true there is that in every heart which proclaims or whispers that every dereliction of duty is worthy of *chastisement?* Are men now able to entertain the same opinion of the thief as of the honest citizen? Hitherto, under every phasis of society it has been deemed just that crime should be punished. So strictly natural and necessary has this seemed, that, in a thousand acts of which no law can take cognizance, society inflicts a chastisement ten times severer than that of the statute-book. The loss of character, for example, entails the loss of livelihood, and hence often of life, under circumstances of great mental and bodily suffering. Has all this been a mistake? 'Are we all' (as Carlyle says) 'effeminated in this very dreary, very portentous babble of *abolishing capital punishment*, &c. &c. —all for sending Judas Iscariot, Courvoisier, Praslin, Tawell, and Nature's own Scoundrels teachable by no hellebore, to the schoolmaster instead of the hangman or the cesspool?' Are we for carrying this new philanthropy out? Ought society to consider the liar, the slanderer, the extortioner, the tyrant, the robber, the ravisher, the assassin—as merely labouring under moral malady, fit therefore for the tender care which humanity bestows on the fatalities of disease? Is it and has it all along been a mere blunder to distinguish practically *badness* from *madness?* If so, we cannot stop where Mr. Hill contemplates. 'Oh! that I could

I could get my son placed at Mettray,' said a French mother, 'but that is impossible — he is neither a beggar nor a thief. —Il n'a ni mendié ni volé.' Turn to any page of the Reports now before us, and you will find the poor man tempted and tempting his offspring to some petty larceny which shall lay on the parish, the county, or the country the burden of first supporting, ultimately of transporting him—a very natural consummation of those doctrines which would confound a most extended and careful *education* with punishment. Offer to the humbler classes of our countrymen the training of their children in the choicest spots of the land, such as Parkhurst—absolve them from all further care and cost—educate the child intellectually and morally—teach him a trade, and then take him, free of expense, to a good though distant labour-market—how few would be left to tenant our jails! If you will believe, and act on the belief, that *punishment* has no tendency either to reform a culprit or to keep away from crime those who know that crime is punished—in short, that our fears have no influence on our conduct—allow the virtuous parent at least such a perspective of good for his child as you hold out to the depraved.

We are told that crimes are on the increase, and that therefore punishment has not acted as a deterrent. The answer is, that however the aggregate of offences may continue to increase in a rapidly multiplying and condensing population, it by no means follows that they would not have increased in a far greater ratio had there been no system of punishment in the country. But how are we to get rid of the *all but* unanimous opinion of the Judges (there is really, we think, only one exception)—that the relaxation has already been carried *at least* far enough? How are we to get rid of the facts of their own experience which these Judges state? How are we to get rid of the facts adduced by Sir James Graham but a few months ago in Parliament—showing that the relaxation of penalties in some of the greatest crimes has been followed by a large increase in their number—that forgeries have increased 100, arson 60, and rape 90 per cent. since they ceased to be capital offences? (*Times, Friday, June* 11, 1847.)

On the question of capital punishment we shall not dwell —we have more than enough before us without recurring to a subject which has already been treated at some length in these pages. As respects the conflicting theories stated at the outset—*the Jurist*—who could not be more worthily represented than by Lord Denman, Lord Justice General Boyle, and Lord Chief Justice O'Doherty—still adheres to his ancient doctrine. The Jurist still holds his province to be simply the protection of society.



He takes cognizance of the acts of man, and has nothing to do with his intentions, which belong (he says) to the domain of the moralist. The former deters, the latter amends. These two governing principles are distinct, but not opposed. Justice can never be immoral, nor morals unjust. But the motives of crime cannot be arrived at by the judge—or, if at all, too imperfectly and rarely—while there are a thousand instances of offence against the moral law which admit of no legislation, and are left to the execration of mankind; such are ingratitude—hard-heartedness—pride—malice—avarice, and a hundred other forms of vice which destroy a life without spilling a drop of blood—rob without stealing, and torture with a more exquisite pain than wheel or rack. The State, however, can set both these principles into action, for its functions include the duty of elevating the moral as well as that of protecting the physical welfare of its dependants. The difficulty has hitherto been to discover a system as to the less heinous class of criminals, which shall at once punish to deter, and amend to restore; and we believe the problem will find its solution in the careful and watchful working of that kind of secondary punishment known as the Separate System. We say advisedly 'careful and watchful.' For there is much to fear from those who would abuse the deterrent principle, and who, seeing no punishment in solitude, would aggravate it by additional restrictions and penalties. On the other hand, they who abjure this principle will endeavour to denude the discipline of all its wholesome severities, leaving nothing to it but the name of a punishment;—and crime will be at a premium whenever the fear of inflicting penalties shall be livelier with the authorities than the fear of suffering penalties in the culprit.

The theory of the Separate System was clearly laid down in 1775 by Paley, in his 'Moral Philosophy.' His chapter on Crimes and Punishments anticipates every modern improvement. He argues first in favour of solitary confinement generally. He states secondly, that as half the vices of low life arise from aversion to labour, there might be two means of eradicating this—one by solitary confinement with hard labour, which shall make industry a new habit—the other by solitary confinement with nothing to do, which shall render idleness intolerable. He next proposes that the prisoner should earn his own livelihood, his earnings being left in part or wholly to his own use; also, that the measurement of confinement should be not by the days spent, but by the work done, in order to render energetic industry voluntary. After the enlargement of the criminal, he says, the principal difficulty still remains —how to dispose of him: and he meets it by the only wise and clear-sighted view of this great problem, namely, that the State is

 bound

bound to secure him employment if willing to work; but that it is absolutely necessary that criminals should be separated as far from each other as possible. Paley's system may therefore be summed in a few words—separation with labour during confinement, and dispersion afterwards.

Had these views been as manfully acted upon as they were convincingly propounded, what a source of misery and guilt would have been dried up in our transportation system,—and how little cause would have been left for the inspectors of prisons to term Newgate the 'great school of crime!' a just designation—as we could show by a thousand extracts from the Life of Mrs. Fry, &c. &c.—but let one from the Rev. Mr. Field's judicious volume suffice:—

'I could mention the name of a person who practised in the law, and was connected with very respectable families. He, for a fraud, was committed to Clerkenwell, and sent from thence to Newgate, in a coach, handcuffed to a noted housebreaker, who was afterwards cast for death. The first night, and the subsequent fortnight, he slept in the same bed with a highwayman on one side, and a man charged with murder on the other. During that period, and long after, spirits were freely introduced. At first he abstained from them, but he soon found that either he must adopt the manners of his companions, or his life would be in danger. . . . . In short, *self preservation rendered it necessary for him to adopt the manners of his associates: by insensible degrees he began to lose his repugnance to their society*—caught their flash terms, and sang their songs, was admitted to their revels, and acquired, in place of habits of perfect sobriety, a taste for spirits; and a taste so strong and so rooted, that even now he finds it difficult to resist the cravings of his diseased thirst for stimulants. The artless statement of his wife, who has throughout conducted herself with unimpeachable propriety, and who laboured with her own hands to support her husband when in confinement, will hardly be rejected.'—*Field on Prison Discipline*, pp. 52–56.

It is curious to remark how slowly and in what a piecemeal fashion the views of Paley—promulgated in 1775—adopted by Howard—nay actually put into practice in Gloucester jail in 1796 and there adhered to until 1813, when they were abandoned from motives of false economy—it is curious, we say, to see how very gradually they faltered into firmness.

Of Howard's three principles of prison discipline—solitary confinement,—regulated labour,—religious instruction—some looked mainly to the second. The State of Pennsylvania in 1786 abolished capital punishment for all but the greatest crimes, and substituted hard labour for minor offences. Though this was a step in the right direction, it failed, because the association of evil minds more than neutralized the anticipated operation of habitual



habitual labour and obedience. To amend this, criminal classification with hard labour was resorted to, which was again an improvement, for classification is partial separation. Nevertheless that also failed; and so long as the human heart is inscrutable to human eyes, must ever fail. The hardened villain was classed with one who perhaps had committed the same offence, but for the first time, and through the temptation of his necessitous poverty; the boy with the man thief. The result was, that the criminal community was divided into classes of crime—small guilds of vice; each member of which brought into the common stock his own particular experience and aptitude; and the prentice-hand had an admirable opportunity of perfecting itself under the master in the craft. This was so forcibly felt as to lead to one of the most terrible experiments ever made to obviate a crying evil. In 1821, the State of New York adopted what is called technically the *Solitary System*—it confined 80 of its criminals in separate cells, in absolute solitude, permitting no exercise, and providing them with an insufficient supply of air, light, and food. Mind and body were crushed under this clumsy and barbarous experiment; some died, many were driven mad, twenty-six were pardoned, and the rest were removed at the end of one year.

This disastrous American expedient has had the greatest influence in modifying the various theories of prison discipline. On the one hand it was palpable that Association gave a gigantic impulse to crime—on the other *the Solitary System* drove the criminal into madness. A mezzo-termine was therefore resorted to—the 'Silent System.' The prisoners were to work in bodies, but in profound silence, and at night to be separated. But this scheme of *association without intercommunication* involved a simple impossibility:—it was soon proved that the history of each criminal was as well known to his fellow under this as where Silence was never thought of. It was found, also, to require a larger and a more expensive staff to work it; and, finally, it demanded such strict watchfulness, and the infliction of such frequent punishments, that the most violent passions were pent up and raging under the calmness of the silent masses which appeared to be moved with the mechanism of clockwork—a state of mind which entirely excludes the shadow of reform in character. The *Silent System* has still its advocates in America—but even there it is obviously sinking in opinion. In Europe it is now found only in subservience to the *Separate System:* while the *Solitary System*, we believe, is discarded everywhere, except as an occasional punishment during a few days for the contumacious prisoner.

The Separate System differs form the Solitary in permitting communication, but not that of the criminals with each other. It seeks

seeks to isolate the prisoner from all evil associations and associates, and substitutes in their stead that which shall tend to make him better and wiser. It inflicts a great amount of punishment without awakening the evil passions which usually attend on it. Except in the incorrigible, nothing of a revengeful feeling is roused; and yet it is greatly dreaded. Some would even seem to prefer death to this solitude. Why is it thus? On what principle of our nature does this power act? All harshness is sedulously avoided; material comforts are abundantly cared for; and yet the man would prefer almost any other punishment to the solitude of his cell. The pangs of a retributive conscience are said to be roused in that dead silence, and to prostrate the criminal. Yet this will not explain all—for some who certainly are never reached by any such influence are among the most unhappy, and in many others there is much wretchedness *before* the mind reflects or mourns over the past. Is the social instinct, which is common to man and to many animals, so essential to the former as to the latter, that to be isolated is to perish? Are the views which Frederick Cuvier has analysed with such ability applicable to our race? And does the great physiological law of the body find its application no less in the mind? so that both follow the same rule, that what is unused languishes and loses its powers, and ultimately its life? We can but open the question, which is both beyond our scope and our limits—leaving it to the metaphysician and the moralist to determine whether we have or have not a third mode of acting on the will of man, by attacking a leading instinct of his nature in addition to the two ordinary powers of affecting his volition through the violences of fear and the perturbations of hope; and we proceed to the practical working of the Separate System.

What a contrast to the pandemonium of associated criminals does the visitor perceive who enters for the first time the walls of the Model Prison at Pentonville! Instead of the noise and bustle of the old Newgates—absolute stillness; a few silent warders only scattered here and there in the large and lofty corridors containing a triple tier of cells, which range the whole length of these galleries! In spite of the blaze of daylight which should enliven, and the scrupulous cleanliness which should raise notions of comfort, it is impossible not to feel the oppression of resistless power; it is in vain, on a first visit, that you are solicited to inspect the minutiæ of the admirable mechanism by which the architect (Colonel Jebb) has contrived to secure the complete isolation of 500 individuals from each other. They are fed at the same moment, rest at the same hour, are out in masses in the open air. They are catechized in the school, and respond in the chapel



chapel—yet man knows not man. There is contiguity, but no neighbourhood; and the very names of the prisoners are lost in the mechanism which assigns *numbers* in their stead.

It requires the aid of sense to confirm the testimony of others, that the prison is really tenanted; the impulse is irresistible to ascertain the fact. A small aperture is so contrived in the door of each cell as to permit the visitor to see its inmate without himself being seen; and he can now traverse a corridor and remark the intensity of still life. All are profoundly engaged —one plying his trade, another busy with his slate, a third fixed and motionless over his Bible. The shoe-maker is squatting cross-legged and stooping over his last; the tailor raised on his table with his implements and materials about him; the weaver hardly distinguishable amid the framework of his active machinery; the basket-maker in his corner, distant an arm's length from the heap of osiers from which ever and anon he is selecting that to which he is about to give a form and shape. It is not here, as in the solitary occupations of the world, that the artizan can beguile his labour with snatches of some favourite melody; nothing must break the silence of the cell. Its inmate soon learns to concentrate all his energies on his work, which becomes to him a solace—a necessity. Unconscious that any eye is upon him, he has no part to act, no sympathy to dream of exciting; and as he now appears, so he will be found at any interval of days, weeks, or months.

If the visitor be still disposed to linger and observe, he will presently see a long file of prisoners emerging from their cells, in such a pre-arranged order that each man is fifteen paces apart from his fellow, and so masked as to render mutual recognition impossible. Thus accoutred and marshalled, and shod so as to prevent sound, one half of the prisoners (250) proceed rapidly to the chapel, the interior of which is so arranged as to preclude even the tallest man from overlooking the one in the next slip. The pulpit is placed high, so as to command a perfect view of every convict, but intercommunion is further prevented by warders perched up on elevations, each with a full inspection of his own section of prisoners. Here at last is the silence broken—by the congregated sound of the simple melodies of our hymns; and there are few places where they strike so impressively on the heart as when they are poured forth amid the suggestive influences of the prison.* The service done, a dial-plate turns round presenting certain letters and numbers, which correspond to the sectional numbers and letters

* There is one daily service at ½ past 8 A.M. The other 250 attend a second service at ½ past 4 P.M.

of

of the prisoners; as these appear, the peak of each cap is again let down so as to mask the features, and the chapel is as silently and quickly emptied as it had before been filled.

At present the distribution of the week-day gives—

| | hrs. | min. |
|---|---|---|
| To school instruction . . . . | 1 | 15 |
| To chapel . . . . . | 0 | 30 |
| To exercise in open air . . . . | 1 | 0 |
| To reading, writing, arithmetic, in cells . | 1 | 47 |
| To cleaning . . . . . | 0 | 37 |
| To rest . . . . . | 10 | 0 |
| To meals . . . . . | 2 | 0 |
| To trade instruction . . . . | 6 | 51 |

The whole prison is thoroughly warmed and ventilated. There is an abundant supply of water for all purposes of cleanliness and comfort in every cell; and gas is let on during the requisite hours, according to the season.

'Every prisoner has at least one hour's exercise daily in the airing grounds. The bedding is removed by each to his exercising yard to be aired—in summer once every week, and in winter as often as weather permits. The prisoners have warm baths every fortnight, and are supplied with clean sheets once in every six weeks, and at proper periods with soap, towels, combs, flannels, whiting, brickdust, and all other articles necessary for keeping their cells in high order, and for personal cleanliness.

'On Sundays the warders assemble at half-past seven, instead of six A.M. The wards and cells are dusted and swept immediately after unlocking. The prisoners are exercised, but no work is performed. There are three services—morning, afternoon, and evening; each occupying an hour and a half. This arrangement admits of every prisoner attending Divine service twice on every alternate Sunday.'

What are the effects of such a system of discipline? Quite innocuous, say some; madness or premature disease, say others. Both opinions are partial. It is hardly to be expected that any individual can fail to suffer, when he is at once imprisoned in body and constrained in mind. On the other hand, those who have designated prisons on the Separate System as 'manufactories for madness,' have probably confounded the *solitary* with the *separate* system. In France, Esquirol and other high authorities on mental diseases have asserted that the latter system has no tendency to deteriorate mind; and, as far as a five years' experience of the working of discipline at Pentonville has gone, close observers all coincide with them. A very strong impression on the nervous system is made, and it requires careful watching to regulate it, but we believe that with such watchfulness it not only is controllable, but essential to that change of mind which



which reforms character. There can be no doubt at least of this fact, that both mental and bodily disease are much less among the Pentonville prisoners than they would have been among the same men, if permitted to pursue their career unchecked. There is a false standard of comparison when you would measure the mortality of vice with that of virtue—of the dissipated with the sober. The ratio should be struck between the criminal population free and the criminal population fettered; and who that has turned a page of any writer on the *classes dangereuses* can hesitate in believing that great saving of life and protection from disease have been effected? Be certain that of all poisons there is none so sure, so penetrating, as a rampant vice, which will first enslave, madden, and then kill, nay, even transmit its fatal tendencies to the offspring.

However, let us examine the facts. If it be true that this Separate System is maddening, it ought to tell most decidedly on such prisoners as are constitutionally predisposed to mental disease. Now on this point we can adduce distinct proof that some two or three score of persons, out of 1000 subjected to the discipline of Pentonville, have actually *benefited* by it in spite of indubitable hereditary taint or absolute individual predisposition. Take the following table from the Chaplain's Evidence in the App. to Fifth Report:—

OBSERVATIONS made upon certain PRISONERS in whom injurious effects might have been feared from Separate Confinement.

| Initials of Name. | Verbatim Extracts from Letter of Referee. | Observations on Degree of Intellect, &c., by the Chaplain when first seen. | Schoolmaster's Report on leaving the Prison. | State on leaving the Prison, as noted by Chaplain. |
|---|---|---|---|---|
| J. C. | Mother touched with symptoms of insanity. | . . | Improved in reading and writing. | Improved generally. |
| R. L. | Grandmother insane . | Read imperfectly. | Read well; write imperfectly; 4 rules of arithmetic. | |
| J. H. | Sister rather weak in mind. | Only knew the alphabet. | Read and write well; Rule of Three. | Very cheerful; improved in general knowledge. |
| H. N. | He and most of his family evinced symptoms of insanity. | Of the lowest kind. | Read very imperfectly; write a little; learned a little arithmetic. | Sent away incorrigible. |
| J. C. | Two sisters insane . . . | Of the lowest intellect: did not know A, B, C. | Read well; write tolerably; 4 rules. | Somewhat improved in general. |
| D. M. | His mother subject to nervous fits. | . . | Read and write well; Rule of Three. | Mentally, not morally, improved. |
| J. D. | One of his family (his mother, as I have every reason to believe), labouring with insanity. | . . | Read and write well; 4 rules | Improved in religious knowledge; very cheerful. |
| . B. | Of a simple turn of mind. Uncle in an asylum. | . . | Improved considerably . . | In Scriptural knowledge also improved in Scriptural knowledge. |
| W. J., alias W. C. B. | Skull fractured three years ago. | . . | Improved in reading and writing; Rule of Three. | |

Observations made upon certain Prisoners—*continued.*

| Initials of Name. | Verbatim Extracts from Letter of Referee. | Observations on Degree of Intellect, &c., by the Chaplain when first seen. | Schoolmaster's Report on leaving the Prison. | State on leaving the Prison, as noted by Chaplain. |
|---|---|---|---|---|
| W. G. | Sister considered rather silly. | Of lowest intellect: did not know the alphabet. | Read and write imperfectly; 4 rules. | Cheerful. |
| A. H. L. | Had become dejected and absent after failure in business, and showed symptoms of insanity. | Very low in spirits. | Read and write well; Rule of Three. | Much improved in spirits; found comfort in religion. |
| J. N. | Considered rather as an idiot. | Very low degree of intellect. | Read and write well; Rule of Three. | Improved in general knowledge. |
| W. N. | Almost *irresponsible* . | Of very weak intellect. | Well educated previously . | Rather improved mentally. |
| A. A. | Weakness of mind: made sport of by fellow-servants. | Low in spirits and in intellect. | Read and write well; Rule of Three. | Mentally improved. |
| F.W.K., alias A. K. | Uncle died in an asylum; another committed suicide. Father and sisters considered weak. | Low in spirits; over-active mind; disliked his trade. | Very well educated . . . . | Morally improved. |
| J. M. F. | Mother's brother is reported to be imbecile; harmless if let alone. | Of a low degree of intellect. | Read and write well; Rule of Three. | Improved in general; was recommended to be master taller on board ship. |
| R. B., alias E. E. S., *q. Jew.* | Not considered quite correct in his mind. Aunt mad for a long time. | Peculiar turn of mind. | . . | Greatly improved, especially in Scriptural knowledge. |
| D. M. | Considered a simpleton | Low intellect . | Read well; write imperfectly; 4 rules. | Improved generally. |
| J. M., alias J. T. | Uncle killed himself in a fit of insanity. | Low in spirits and intellect. | Read well; write tolerably; Rule of Three. | Much improved. |
| C. J. C. | Eldest brother exhibited symptoms of insanity. | Good intellect | Well educated . . . . . | Improved generally. |
| T. N. | Whole family eccentric; and very weak in intellect. | Weak intellect | Read and write well; Rule of Three. | Improved generally. |
| R. R. | Uncle's intellect affected at times. | Low intellect; only knew the alphabet. | Read well; write imperfectly; 4 rules. | Improved generally. |
| J. T. | Father died a lunatic . | Ordinary intellect. | Reads and writes well; Rule of Three. | Very much improved in general. |
| J. S. | I have thought, and more, I am sure, that at times he was not altogether right in his head. | More than ordinarily reserved and very dull. | Read tolerably; wrote imperfectly; improvement very little. | On the whole rather improved. |
| H. C., alias L. | The prisoner's conduct, more especially his wandering propensities, are irreconcilable with perfect sanity. | A good intellect; apparently much compunction for sin. | Could read and write well; considerably advanced in the higher rules of arithmetic. Improvement tolerably fair. | Improved very much. Found peace and comfort in the Gospel. |
| G. R. | He was not quite sound in mind, and sometimes not conscious of what he was about. His own sister destroyed herself. | A very low-spirited man. | Could read and write very well; considerably advanced in the higher rules of arithmetic; intelligent. Made fair improvement. | Improved in spirits. Found comfort in religion also, I think. |
| W. H. | His mother has evinced symptoms of insanity within the last three years. | Nothing at all peculiar. | Read well, wrote tolerably; higher rules of arithmetic. Improvement tolerable. | Improved very much, especially in the memory. Gave himself to learning hymns, chapters, &c. |
| H. L. | His father was subject to fits. | Very low spirited | Could read and write well; mensuration. Improvement tolerable. | Very downhearted; would have sunk here, I think, but for some religious hope. |



Observations made upon certain Prisoners—*continued.*

| Initials of Name. | Verbatim Extract from Letter of Referee. | Observations on Degree of Intellect, &c., by the Chaplain when first seen. | Schoolmaster's Report on leaving the Prison. | State on leaving the Prison, as noted by Chaplain. |
|---|---|---|---|---|
| J. B. | One member of the family has exhibited symptoms of insanity. | Ordinary . . . | Read well, wrote tolerably; knew the common rules of arithmetic. Very much improved. | Improved. |
| H. B. | I have known the prisoner to have fits when over-fatigued. | Ordinary . . . | Read well, wrote tolerably; common rules of arithmetic. Improvement tolerable. | Very cheerful. |
| J. K. | He received an injury in his head, from which time he became flighty and unsteady. His father was in some measure imbecile in both body and mind. | A very active mind, but most perverse. | Could read and write well; higher rules of arithmetic. Improvement tolerable. | Cultivated his mind assiduously, but was very perverse to the last. |
| W. S., alias S. | Has found him a little insane at times; he was kicked by a horse in the head. | Ordinary . . . | Could read well, write tolerably; knew the first 4 rules in arithmetic. Improvement little. | Rather improved. |
| W. F. | I knew him to labour under a severe nervous fever for several months, which I always observed afterwards to cause a lowness of spirits. It was about 6 years since. | Good, but his constitution apparently weakened by intemperance. | Read and write well; advanced in higher rules of arithmetic. Tolerably improved. | Very cheerful; much improved, I think, in every way. Gave great attention to religion. |
| J. A., alias E. W. | Has not his senses perfect. | Half-witted . . | Could read well. Made scarcely any improvement. | Rather worse. |
| W. D., alias J. B. | I fully believe him to be at times insane. His maternal grandfather died insane. | Clever; good, but perverted and abused. | Was well educated on admission. Was excused from school; improved himself tolerably by reading and private study. | Not improved. |
| W. B. | Very apt in many things | Low intellect . | Could scarcely read any. Very little improved. | Rather worse. |
| J. D. | His grandmother is in a lunatic asylum. | Ordinary, but very dull. | Read well, write tolerably; first 4 rules of arithmetic. Improved a little. | Improved rather in spirits. |
| J. B. | His mother, grandmother and great aunt, were all subject to insanity. | Very peculiar and low spirited. | Read scarcely any. Improvement very little. | Worse when removed, but got better at Woolwich. |
| D. B. | Showed decided symptoms of insanity. On one occasion he sought for an instrument to take his life. | A very good intellect, but reserved and very peculiar. | Read and write well; higher rules of arithmetic. Considerably improved. | Improved, I think, generally. |
| H. G., alias V. | Has been subject to fits at different periods: I have always found him very dull in intellect. | Ordinary; communicative, but very dull in his manner. | Read and write well; higher rules of arithmetic. A fair degree of improvement. | Was, on the whole, better. Gave great attention to religious knowledge. |
| S. H. | Of very curious temper, and sometimes rather childish. | Nothing peculiar | Read well, write tolerably; first 4 rules of arithmetic. Improved a little. | Rather improved. |
| C. F. | Light and incoherent in his habits. Eldest brother perfectly deranged, and was kept bound, hands and feet. | Ordinary intellect, but looks & talks strangely. | Read well, write tolerably; higher rules of arithmetic. Improvement tolerable. | Always cheerful, and rather improved in those things in which he was singular. |

The inference is clear, that the greater portion of these men were benefited. If we look at the actual cases of mania occurring, the tables yield the following results. In the first year (1843), of 332 convicts, the daily average in the prison, three became affected with insanity. In 1844, when the daily average was 456, no case occurred. There was one in each of the two following years—when the daily averages were respectively 445 and 423.—In 1843 the cases were in the proportion of 9·03 per 1000.—During the whole period (four years and a quarter) since the prison was opened, the proportion of cases to the daily average of prisoners has been that of 2·29 per 1000 annually.—From the end of the year 1843 to the present time the annual proportion has been no more than 1·48 per 1000.

The Reporters say:—

'The remarkable difference in the number of cases of insanity at these different periods may have been partly owing to accidental circumstances. We believe, however, that to a great extent it admits of explanation, and that in the year 1843 there were some special causes in operation tending to affect the minds of the prisoners, which do not exist at the present time. However that may be, there is reason to be satisfied with the result, when we find that the proportion of insanity in the last three years has not been more than one-sixth part of what it was in the first instance.

'The statistics of insanity do not afford us the means of comparing the amount of this disease which exists at Pentonville with that in the general population. It would be more to the purpose to compare it with that which is met with in other prisons; but here also we have found it difficult to obtain such data as would enable us to arrive at an accurate conclusion. The returns from the various prisons of England and Wales, however, justify us in believing that, if the year 1843 be excluded from the calculation, the proportion of prisoners who were affected with insanity after committal to Pentonville is actually smaller than what occurs among persons of the same age in other places of confinement. The conclusion to be drawn is certainly favourable to the separate system. But it is still more so when we take into the account that, while other prisons contain individuals of all ages, the Pentonville prisoners, with a few exceptions, are from twenty to forty years of age; and that it is proved by the experience of such English and foreign lunatic asylums, nine in number, as afford the opportunity of making the comparison, that in no less than 57 per cent. of the whole number of insane persons the symptoms of the disease are first manifested in the course of these twenty years.'

Of course no exact comparison can be made between the inmates for eighteen months of Pentonville and the miscellaneous and diversely sentenced residents in any ordinary jail; but the Commissioners are so far supported by the following Note, for which



which we are obliged to Mr. Perry, Inspector of Prisons in the Southern and Western Districts. This officer says—

'The places of confinement in the southern and western districts are eighty in number—of which seven are conducted on the separate system. In the year from 29th Sept. 1844, to 29th Sept. 1845, the daily average of prisoners in the whole eighty places was 4361—in the seven on the separate system it was 644. The average period of confinement was rather less than seven weeks. Thirty-seven prisoners were affected with insanity; in nine of whom the symptoms first showed themselves during the period of their imprisonment: but of these nine, not one occurred in the seven on the separate system. The proportion of fresh cases of insanity was therefore 2·06 per 1000 in the year, being somewhat less than the proportion at Pentonville during the whole period that has elapsed since the prison was opened; but considerably greater, if the year 1843 be excluded from the calculation.'

The following RETURN well deserves to be considered in connexion with the foregoing statement of the Pentonville Commissioners. It will show the annual ratio of mental disease per 1000 strength, in our troops quartered at home, or in our most healthy stations abroad. We are indebted for it to Dr. Balfour of the Guards:—

| STATIONS. | Period of Observation. | Strength. | Cases of Mental Derangement admitted into Hospital. | Ratio of Admission per 1000 of strength per annum. |
|---|---|---|---|---|
| United Kingdom— | | | | |
| Grenadier Guards | 15 years, 1831–45 | 26,580 | 14 | 0·52 |
| Dragoon Guards and Dragoons | 7 years, 1830–36 | 44,611 | 42 | 0·94 |
| Gibraltar | 19 years, 1818–36 | 60,269 | 85 | 1·41 |
| Malta | 20 years, 1817–36 | 40,826 | 45 | 1·10 |
| Ionian Islands | ,, ,, | 70,283 | 101 | 1·43 |
| Bermudas | ,, ,, | 11,721 | 9 | 0·77 |
| Canada | ,, ,, | 46,442 | 62 | 1·33 |
| Nova Scotia and New Brunswick | ,, ,, | 64,280 | 49 | 0·76 |

Compare the numbers in the last column with the recorded amount of mental disease among 1000 per annum in the model prison, and we shall find that—while the annual ratio in the latter is 1·48—it is nearly 1· at home among the Dragoon Guards and Dragoons.—1·43 in the Ionian Islands,—1·33 in Canada,—and 1·41 in Gibraltar; so that it may be fairly said that the prisoner under separate confinement suffers about as much as the soldier on the choicest spots of the Mediterranean, or in the bracing climate of Canada.

The Pentonville Commissioners very properly acknowledge the

the want of *data* for a deduction of mathematical accuracy: but looking at the general results, they seem to be fully justified in their belief that the effect of the separate system, when enforced for eighteen months, is not injurious to the human mind; and we think we have evidence before us which sustains equally the opinion that it is not injurious to the physical health. On this last point the writers hostile to the system rest certainly on grounds far less safe than those adduced by the Commissioners. For example, these writers think it much for their argument that the mortality per 1000 in the metropolitan population between the ages of 20—40 is 10, while it is 15 at Pentonville, or one-third more. The gross results are merely looked at, and it is not considered that—while the population of the prison is selected from a vicious community—that of the metropolis includes the sober and industrious. Men gamble with life—the honest equally with the dishonest. There is not the slightest doubt that the latter are greatly the losers, are pained more, gain less, and die very much sooner than the former. But in the honest and honourable pursuits of life is there no risk? Take the casualties of our soldiers, for example, in England, in home service. While the annual mortality of Pentonville per 1000 is 15·70, that of the Foot Guards is 21·6—nay, the mortality from consumption alone in the Guards is nearly as high (14·1 per 1000) as the total mortality of Pentonville prisoners—men, be it remarked, of about the same age on an average as the soldiers. Even in the Household Cavalry the mortality, varying from 13 to 15⅞ per 1000, is but a fraction less than that of the criminal population in the Model Prison. 'Yet these soldiers,' says Colonel Tulloch, 'carefully selected, and, so far as can be ascertained, subject to no physical defect at enlistment, are better fed, better lodged, and have less onerous duties to perform than the great mass of the labouring population.' —*Report on the Mortality of Troops*, p. 4.

The chief lowerers of life on the prisoner are bad food, bad air, and depressing passions. The two former are so completely under control as to admit of any degree of modification. The mind of man is a more stubborn element; nevertheless the discipline of the cell is so essentially mental as to leave no doubt of its effects on the generality.

It is not chimerical to hope that, as all the circumstances of imprisonment are more or less controllable, so most of its decided injuries may be warded off. It is curious to remark the effects of diet on the prisoners (*5th Report*, p. 12)—how little shook the scales in the balance of health and disease. No less striking has been the diminution of consumptive cases from attention to *suspicious*



*suspicions* as to their origin. From the opening of the prison to the termination of 1844, the annual mortality per 1000 from phthisis had amounted to 11·47. The physician, Dr. Owen Rees, suspected that the dusty trades carried on in the cells might have added to the chances of death by this disease. In 1845 measures were taken to guard against the supposed cause; in 1846 only four cases per 1000 of consumption occurred; and in 1847 (up to the 20th of October) there has not been a single death from this terrible scourge.

We could readily produce evidence that the mortality in many callings is much greater than in prisons; but we have purposely selected the soldier at home. If the discipline of the cell is not worse in its physical and mental effects than that of the parade, there should not be much to complain of. It has been objected, that to carry through that of the Separate System, a large amount of food and more active stimulants also are required. This, however, is not the case. As compared with the consumption of the soldier, the prisoner is underfed: the former has daily twelve ounces of meat, and a pound of bread, with coffee and vegetables, and this may be increased under the discretion of the commanding officer—not to say his own; the prisoner has four ounces of meat, and twenty ounces of bread per day, with vegetables, gruel, and cocoa. It was only after repeated experiments and careful weighing of each prisoner that the dietary was adopted. On a daily average of 423 prisoners, in 1846, 37 required extra diet. In some the addition was merely a few ounces of bread; in others, stimulants were given, as wine and porter. With regard to the extra diet—even including these extras the amount of food is never greater than that of the ration of the soldier, and in most cases not so great. Occasionally, of course, stimulants are required for the sick and weakly in all hospitals, military or civil; but the documents as to the relative stress of wear and tear on the soldier and prisoner are precise. At Pentonville, then, the daily ratio is 14 sick in 423, or about 33 in 1000. In the Prussian army the daily average during ten years is 44 per 1000. Among 1000 of the Dragoon Guards and Dragoons serving in the United Kingdom, 40 are daily sick. Much stress has been laid as to the Pentonville prisoners being 'selected.' It is true they are, but selected notoriously from a short-lived and ill-conditioned class. Provided no overt disease or marked diseased tendency be apparent, the convict is at once admitted; and we have seen from the table furnished by the chaplain that many are received whose minds and bodies exhibit anything but a vigorous constitution. It is an abuse of terms to call this selection, as compared with the kind of man required for the Dragoon Guards. No insurance

office

office would take the majority of Pentonville prisoners even as average lives; a very cursory glance at the congregation in the chapel is sufficient to satisfy any physician on that point. In truth, there can be no question that the mass of our genuine criminal population is below par in physical, if not also in mental calibre.

With regard to the injurious effect on 'the will,' as evidenced in 'the listless look,' 'the want of alacrity,' 'the loss of their gregarious habits,' a supposed 'dulness of comprehension,' &c., we may say, that this faculty is certainly the one most influenced by the discipline of the separate system. All but a few reprobates are thoroughly tamed. Punishments to enforce obedience are very rare; no corporal punishments have ever been required at Pentonville. The aspect of men who have been kept in comparative seclusion, and whose thoughts have been forcibly turned within, no doubt may present peculiarities. The prompt and constant subjection to the will of others may also give a cast to the physiognomy; but if will does not mean wilfulness, there is abundant evidence to show that that faculty is in full vigour under the separate system. Whether the test be taken from assiduous labour at a trade or in school, the proficiency of the disciple shows a hearty and a healthy direction of his will. It is not to be supposed that the labour of learning, which he has hitherto abhorred, does not now demand a sustained effort of will. The chaplain reports that, of 1000 prisoners, 696 at leaving the place possessed 'considerable general knowledge'—that 713 had mastered the 'higher rules of arithmetic'—and that in many cases it is found necessary to check and moderate the ardour of investigation—especially as to religious subjects. Take from the same gentleman's paper the following out of many specimens of the concentrated activity of the mind in the Pentonville prisoner:—

'Reg. 432. This man had received, he told me, some injuries in his head from falling down a steep place some years back; had been a vagrant and singing beggar in the streets, and an associate of gipsies. When he left this place, whatever his moral character may prove to be (of which I am not now speaking), he knew more of religion and of general subjects than even respectable working artizans in general.

'Reg. Nos. 548, 598, 685, and 558. These men were of uncommonly low intellect, and on admission did not know the alphabet; they now write their own letters, and so well express their ideas on the simple subjects before them, that their relatives can scarcely believe that they are the writers.

'Reg. 580, a cab-driver—elevated now from the most debased and ignorant state to a very good acquaintance with religion and the elements of secular knowledge. His health, almost ruined by spirit-drinking, is also visibly improved.

Reg.



'Reg. 689 is an instance of a mind of some power, but previously uncultivated. He could read when he came, but had no knowledge of figures. Having made himself master of Thompson's Arithmetic however, he is now working at mensuration by himself; for the masters lose no time upon such.

'Of Reg. 504 I may confidently say that he so cultivated his mind in solitude, latterly with the help of books only, that he was sufficiently well grounded to begin a course of study in the higher departments of almost any one subject of useful knowledge. His proficiency in the trade of basket-making was equally remarkable. Being very much interested in this young man, I took a copy of one of his letters to his family, in which he says:—"I will tell you how I amuse myself of an evening, after work, on school-days, and at meal-times. I peruse and study those works which you were so kind as to send me, and then when my hands are busily engaged in 'bending the pliant twig,' my head is equally busy in applying the theory. I divide my subject into three parts, and allot a fixed portion of time to each; and when I am at exercise I have a turn at mental arithmetic. That pump is a rare place for summing; the revolutions of the handle answer the purpose of a slate, and the clicking of the wheel makes it equal to any ready-reckoner. During the summer I had an hour's practical experience in the study of natural history every day; it was rather on a small scale, and I dare say you will smile at it, but it gave me information and amusement too. In front of our airing-yard there is a grassplat, and I distinguished about a dozen different sorts of small plants and grasses, to which I gave names of my own. I found out at what time they came into flower, how long they remained, and the degree in which each was able to bear the drought that occurred. I learned the habits of several kinds of insects; and the sparrows, building their nests or feeding their young in the holes of the wall, afforded me another source of entertainment. Such is the plan I have adopted. It may seem foolish to you, who may look about you as you please, but it is to this I attribute, with God's blessing, the good health I enjoy and the rapidity with which time passes away."'

We shall not extend this paper by tracing more minutely the various feelings and dispositions educed under the Separate System. Nor shall we dwell on the testimonies of the Judges and other responsible watchers of this discipline. As one example, we find the Lord Justice Clerk of Scotland expressing in his evidence (a most careful and elaborate document) great satisfaction that the arrangement of most of the Scotch jails is now such as to admit the adoption of the Separate System, and his earnest desire to see the same thing practicable at Edinburgh and Glasgow. But let us at once proceed to the history of the convicts after their removal from Pentonville.

About 218 were sent to Van Diemen's Land, under regulations laid down in Lord Stanley's able dispatch of November, 1842. According to these a prisoner could by good conduct

gradually pass through various grades of relaxation of his sentence, until he entitled himself virtually to absolute pardon: but the radical defect of the system rendered all skilful details quite nugatory. Criminals were associated in gangs, and therefore deteriorated; the shocking scenes brought to light by the Reports on our convict population in Norfolk Island and Van Diemen's Land, paralleled only by the cities of the plain, proved too clearly the wisdom of Paley's rule, 'the necessity of dispersion.' These Reports, too, show that the Assignment System, which separated and absorbed the criminal population, was preferable to that which succeeded it. It succumbed, as we all know, to the cry of 'white slavery,' though in reality it had a far greater analogy to our home apprenticeship, with all its inequalities of lot, than to that with the name of which it was stigmatized. However, the Pentonville prisoners who arrived at Van Diemen's Land under promises of employment, found none. They were thrown among large gangs of convicts, idle, reckless, and depraved—and moving in masses over the country, to the terror of the inhabitants, no wonder that the good seed was choked by the tares. Some appear to have struggled hard, judging by their letters; but the very great majority, we believe, fell rapidly to the level of the slime.

The condition of the convict colonies was such that it was deemed fit to put a stop for a period to further transportation thither; but as no other of our colonies will receive a criminal population, or can legally be compelled to do so, an expedient was now resorted to which permitted them to receive transports without infringement of the law. The convicts lost their penal character—were dubbed 'exiles,' and thus acquired at once, within the colony, the privileges of freemen. In a word, in lieu of the old system of transportation, criminals underwent 18 months of the Separate System, and were sent abroad pardoned and free, with the sole condition that they should not return to England pending their term of sentence. Of the working of this plan in the case of some 460 Pentonville convicts, we have found access to pretty full details—and we can thus enable our reader to judge for himself what is the amount of *punishment* awarded by England in A.D. 1847 to the second class of crimes. We must premise, however, that the whole of this most difficult subject seems to be at sea at present. We are apparently about to abolish transportation and adopt the old *système des Bagnes* of France, while our neighbours themselves are doing away or modifying the system of keeping criminals at home, and adopting that of deporting them to Algeria. We are thinking of employing convicts in gangs on public works and in our arsenals; our neighbours have come to the



the conclusion that the valuable property contained in them would be just as safe when unguarded by a population who do not stick at murder or arson to gain their liberty. We have as yet limited the cellular discipline to eighteen months. Prussia and France and other countries have made it indefinite. However, among ourselves it would appear that many would see no objection to a longer period, or at least to recommittal to the same discipline on a second offence. Mr. Recorder Hill would only let the criminal free on proof of amendment; fixing no limit to imprisonment but that of public safety; modifying, however, the rigidness of the discipline; in short, treating the incorrigible as mad, or at least as constitutionally or organically vicious. If society could tolerate the notion, in the first place, in its present mood, and, in the second, the expense, it would certainly be protected by this mitigated *Draconism*—for the hopelessly incorrigible would die out with no worse treatment than that under which Messrs. Oxford and Macnaghten do not groan.

In the Appendix to the fourth Report on the Model Prison is a letter from Mr. Hampton, who took out 345 Pentonville people in the Sir George Seymour, in October, 1844, containing a very curious account of their amusements and occupations. The convicts seemed to have profited amazingly by their education in the prison, judging from the topics on which they 'lectured'—'advantages of education,' 'use and abuse of music,' 'comparative anatomy,' 'English history,' 'origin of names,' 'astronomy,' 'poetry,' 'the duties of domestic servants,' 'architecture.' No doubt many of the lecturers were previous adepts—for, alas, the prison has had its scholars as well as its clowns. But the thirst for knowledge increases very greatly in the *cell*, and it is rapidly imbibed. We have had access to some other letters from gentlemen in charge of convicts, which bring the story of the experiment down to the present year. For example, Mr. Baker (an amiable and judicious surgeon of the Royal Navy) writes thus to the Governor at Pentonville from Port Phillip, May 9, 1847:—

'The exiles, taking them as a whole, behaved well during the voyage, but there was a marked difference. I had three times the number of Pentonville men that I had from Milbank—and the Milbank offenders were very much more in number and out of proportion, and their crimes more serious. I cannot account for this; they were, with one or two exceptions, rather younger than the Pentonville men, but apparently older in iniquity, and required constant watching on my part to keep them from making a disturbance when below; they in fact had not the quiet, social *gregarious* habits of the Pentonville men.'

Another experienced superintendent, Dr. Robertson, R.N.,

 writing

writing on the 19th of July, 1847, after his return to England, says,

'My voyage to Hobart-town lasted 118 days. Prayers were read twice daily, and every Sunday a portion of Scripture was expounded, and I have much pleasure in saying that I never saw greater decorum and apparent sympathy in scriptural feelings than on all occasions of worship. To myself they were at all times obedient, attentively anticipating my wishes, and in every way conducted themselves to my satisfaction; indeed their manner did not cease with their leaving the ship, for I subsequently experienced it from them, wherever I met them in the colony. As a proof of the confidence I had, on arriving at Hobart-town I volunteered to take them on to Port Phillip without any guard, civil or military. I feel quite positive that if I had had a thousand such men, they would have been readily engaged within the week. . . . . During the ninety days I spent in the Port Phillip district I visited various parts of the country within a hundred miles of Melbourne, frequently meeting the exiles in the fields and on the roads, &c., some as shepherds, some as labourers in the charge of wool-carts, and one as a *bullock-driver*. They seemed to a man satisfied with the treatment they received from the country gentlemen; and I was glad to find that there was general satisfaction expressed by the latter. . . . . A petition was being signed for the purpose of inducing the Home Government to continue sending out these servants; and expressing their readiness to bear the half of any expense it may cost to send out their wives and children also. With respect to the number of men that might annually find employment in the district of Port Phillip, I should say at least 4000—I have been told the double, by persons of experience—and I have no doubt that in a few years, as the stock increases at the rate of one hundred per cent. annually, they will require the larger number. At present the sheep are put into flocks of 4000 and upwards, from the want of persons to attend them in the proper divisions of 1000 each, much to the injury of the feed and stock.'

We have also on our desk a whole sheaf of epistles from exiled convicts to their friends at home, and from these we shall select such specimens as will afford clearer notions of their lot than anything we could substitute.

No. 1.

'Geelong, Port Phillip.

'Rev. Sir,—I beg to be excused for taking the liberty of addressing myself to you, but I feel it my bounden duty to return you my sincere and humble thanks for all the instruction and many good advices I have received from you, which I hope have not been altogether in vain.

'Since my arrival in this colony I have had an opportunity of observing the general conduct of many of the first P. P. exiles, and I am happy to say that many seem to have profited by their late afflictions, and to live an upright and honest life; but, on the other hand, I am sorry to say that some appear to be almost past recovery, and to have forgotten



orgotten all the good resolutions and the many solemn promises made whilst in their solitary cell. The same is to be observed in the case of my own shipmates: some keep the narrow path, which they entered first perhaps under your instruction and guidance, and others have thrown off all regard for religion, and fear neither God nor man. Two of my shipmates absconded from my master; but they were taken in a few days, and got three months in Melbourne gaol. But with these discouraging news, as they must be to you, be not discouraged in your good work; but persevere, putting your trust in the Lord, for your labour shall not be in vain. I beg to remain your humble servant,

'To the Rev. J. Kingsmill.' '—— ——, Reg. 514.'

No. 2.

'Jan. 30, 1847.

'Dear Mother and Relations,—I write these few lines hoping they will find you all well, as they leave me. I have now been in this colony six months, and I have seen a little of the bush. At first I thought a life in the bush would agree well with me; but a country life here is quite different from a country life in Britain. It is very lonesome here, the houses being so far from one another. My next door neighbour is three miles off, where we are obliged to go two or three times a-day, often upon any little errand; but three miles are thought no more here than 300 yards in England. I very seldom see any fresh faces. In Britain the merry church-bells are to be heard on Sundays in all directions; but here there are no churches, only in the towns, and they are few and far between. I am 30 miles from the nearest place of worship, which is a mission station. The natural result of the absence of places of worship is, that there is very little difference between Sunday and another day. It is a common saying that Sunday don't cross the Breakwater (which is a bridge near Corio); but public-houses are to be met with in all directions, and they are the ruin of hundreds in this colony, wine and spirits being very cheap.

'It is now the end of winter here, and very pleasant weather it is. The rain sometimes pours down in torrents for six or seven days together without stopping, and hailstones as large as marbles sometimes break windows, and even kill small birds. The thunder-storms are awful,—the flashes of lightning follow each other so rapidly, that it seems one continual blaze,—the thunder roars, the rain pours down in torrents, the wind tears up trees by the roots,—in short, it is enough to make the stoutest heart tremble, and forces at least an awful reverence for nature's God, who rules and governs all, at whose words the fiery elements are pacified, the rains and wind cease, and pleasant summer once more takes their place. If God give me health, I shall be able to save at least 50*l.* in four years, when, please God, I shall return to my injured friends. I have had very good health since my arrival here; and this is a country where there is plenty of work for everybody, and where there is no want, but all enjoy the necessaries, and even the luxuries of life, which is not the case in England. But still there is no place like home. Though I have a large share of what ought to make life happy,

happy, good wages, plenty to eat and drink, and very little to do, still my thoughts are fixed upon home.'

No. 3.

'Dear Parents,—I am doing very well at present, carrying on the business of a boarding establishment. I have taken my premises on a lease for three years, which is capable of accommodating thirty people, and nearly that number I have now in my house; two milking cows, one goat, fowls, ducks, &c., all which I keep for my own use, and 50*l.* cash in the bank, besides my household goods and cooking utensils, which are worth 100*l.* I have to thank my God for his lasting kindness in preserving me, and carrying me through so many trials and temptations over the vast trackless ocean.

'Dear Friends, the country I am in is certainly a very fine one in many respects—plenty of work—no one to do it, and excellent wages given to every one. Even a common labouring woman in my house gets 20*l.* per year and everything found them; even myself, I am giving a man cook 26*l.* per year, his food, lodging, and washing found him, and the lowest terms for washing clothes is 3*s.* per dozen. I wish you could but come out to me, you would never regret it, especially my sisters; there is every prospect of their doing well and making a fortune. I stand the heat very well indeed, and I like the country, though not so well as my own England. I should before now have sent you a little money; but I do not know where you are, or whether you are living or dead, by my not having a letter from you. Depend upon it, dear relations, I will not forget you now I have it in my power to do so. A long and happy life to you, my dear parents and affectionate sisters.'

No. 4.

'Corio Street, Geelong, Port Phillip.

'My dear Wife,—I am happy to inform you that I have been fortunate enough to get into a comfortable shop, where I am getting my thirty guineas a-year, board, lodging, and washing. I have been at work for eight weeks, and, thank the Lord, I am very comfortable indeed. My dear Hannah, I dare say you have been waiting with an anxious heart, to know of my safe arrival. We had a long passage, better than four months before I set my feet on dry ground; but thanks be to God for his great mercy towards us, for bringing me, I may suppose, into one of the finest countries in all the world. Dear Hannah, my master has been trying if he could get you and the children out free, but I am sorry to say that he cannot. I shall be able to send 28*l.*, if I have my health, and it will take 30*l.*; but my dear wife, I should not feel comfortable for you to come out by yourself, it is a long passage for you and the two dear children. If you could get Mary Ann, or your brother John, as they might do wonderful well here. A female servant is looked upon here in a very different light to what they are in England. They are getting from 20*l.* to 30*l.* a-year, and men-servants from 30*l.* to 40*l.* Even a common farming lad gets his 20*l.* or 22*l.* a-year. You may depend that I should be glad to have you over. It is true that I have been sent out of the country against my wish; but



but you could come different to that. It would be to our advantage to be together, because less would do for us than to be separate.

'Dear Hannah, I have not told you of my freedom—I am as free as ever I was in England. No one ever looks upon me as a prisoner—quite the reverse; but I cannot leave the colony until my time is up.

'You can go to Mr. Kingsmill and let him read my letter, for it was his wish, and it is no more than my duty, for he was a kind fatherly gentleman to me; and I am happy to say that I am able to go to my church every Sunday, which I know he will be glad to hear. Those dear children have set a mark upon my heart that I never can forget, for my daily prayer is for you and the dear little creatures. If alive, they must be grown two beautiful children. I wish I could send them a few parrots, for they fly about like pigeons; you may buy them of the natives for 6*d.* each. They are very handsome indeed: in fact the country abounds in such sort of birds.

'The snakes are death if not taken in time, and rarely got over. They are things that I hate very much; but I am not up in the country where they are; for it would be awful to me to go amongst the natives, for they are cannibals. They met one of the first lot of men that came from Pentonville: they made him strip, and then felt him. A very fine thing for him that he was not fat enough for them, so they let him go again. But they are not so savage where I am; so do not let this frighten you in coming out. My dear Hannah, I think you would like the place very much if you were only in it. The time seems long to me, and always will, till I can get with you again; and, my dear, I hope there is a better prospect than ever there was in England, and by the time my 12 months is up that I shall be as good a tradesman as my master. Of course I could not take my work as a man that had been brought up to the trade, but, thank God, I get on remarkably well. My master is very well satisfied with me. He is a teetotaller, and so am I, and mean to be so till I have got you over. My dear Hannah, we live most excellently. I went to-night to the butcher's, and bought a leg of mutton, 8 lbs. weight, for 16*d.* Three of us sat down to tea off it, cut up in chops, and the rest we put away for breakfast, please God we are all spared.

'I always think of you and my beloved children—bless their pretty hearts. Give them a thousand kisses for me, and tell my dear little Johnny I shall want him soon to work as a tinker with me. It is as good a trade as any one in the colony; for earthenware is very dear here. A teacup and saucer is 6*d.* the commonest, so that they all use tin. I hope you have spent a comfortable Christmas. My dear, I hope you have plenty to eat and drink, for I have an abundance. I had to cook my master's dinner, and he said it was the best dinner he ever eat. They are very partial to me, and he leaves me in charge of the shop to sell anything that may be asked for. We have three shops, so that I and two more stop in this one; and, my dear wife, I will do him justice, because he is deserving of it. Now, my dear beloved wife, I wish you all a happy new year, and many of them. God grant that this may find you alive and my blessed children, as it leaves me this night, thank

God

God for it. Forgive me, my dear wife, the ill that I have done you, and I hope it will be in my power soon to assist you. God bless you all, and farewell for the present, till we shall meet again, to part no more.'

No. 5.

'Melbourne, in Port Phillip, March, 1847.

'My dear and affectionate Wife,

'I have to inform you that Mr. —— has got his wife and child here; they came out in the "Spartan" barque, from London, a month after our arrival, and are quite well and doing very comfortable. My dear, allow me to say, with truth, it was not riches and wealth, which she could have obtained had she have stopped with her friends; but it was pure love that she had for a poor fallen one, whom it hath pleased the Almighty God to raise again, that made her come out the four months' voyage to him. My dear, I trust that there is some share of that pure love that did once exist left for me, and cause you and my dear child once more to make me happy. My dear, I did think that I should have received a letter from you before this time. My dear, living is so cheap, that a man, his wife, and a family of four children may live for 10*s.* a-week, and have meat three times a-day. My dear, the shipwright's pay is from 7*s.* to 8*s.* a-day. If you cannot get friends to fit you out and our dear child for the voyage, write, and that as soon as possible, and I have no doubt it will be in my power to remit you what you may require for the purpose. You will, if you please, remember me to Mr. Kingsmill, a kind and benevolent Christian. Tell him I am quite well, and by the blessing of the Lord and my perseverance I trust that I shall prosper, and once more be the means of supporting and making happy and comfortable my wife and child. Thank him for all his kind admonitions to me. Give my respects to Mr. Woodcock, my instructor. I hope he and his family are quite well.'

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When Mr. Baker, one of whose letters we have quoted, arrived this year in Australia Felix, one of his former charge met him with the exclamation 'We have all tumbled on our legs, sir.' He soon found this to be the truth. Within fifteen months the majority of those whom he had formerly carried out were well off. One could afford to pay 150*l.* of rent for an inn; several had houses costing 30*l.* to 40*l.* per annum. Melbourne, the capital, had added 3000 souls to its population. The bush teemed with its denizens. 'Boats full of these enterprising men came alongside the ship, eager to hire farm-labourers and other servants.' Such was the demand, that the contractor for government-works refused to take up any further engagements, in consequence of the very high rate of wages. A long list of Pentonville men, with their wages, their masters, and location, is now before us, which would raise the envy of many an honest struggler at home—board, lodging, and 25*l.* to 30*l.* a-year. The large proprietors



prietors being short of emigrant-hands, and without prospects of getting them from home, were sending vessels to Polynesia for natives, sixty of whom had already been located on one gentleman's property (Mr. Boyd's).

Here, then, is a labour-market which, it is plain, would for many years absorb thousands upon thousands of our population; and, from the nature of the country, it affords that great desideratum of criminal management—the power of dispersion. Thoughtful men, however, have been startled at the enormous advantages which this new system offers to criminals, and which seems to make punishment look very like reward:—

'I entirely agree,' says Lord Denman, 'in the opinion that advantage should be taken of imprisonment to inculcate principles of morality, but I greatly dread the effects of giving them benefits and privileges which they never could have hoped for but from the commission of crimes. I own myself extremely jealous of the gratuitous instruction of the felon in a trade merely because he is a felon, and of the displacement of the honest from employment by *his* success in obtaining it.'

These words, we venture to say, will be recalled hereafter. They open a most grave question. Meantime, not to wander from our own immediate object, it seems to be the opinion of all the Superintendents, that under the discipline of the Separate System, with its *industrial and moral training*, and the subsequent deportation of criminals to a good labour-market, the great majority are reclaimed. Transportation so conducted, and with such results, is not likely, in the present state of public feeling, to want its powerful supporters; we need not, we think, doubt that it will be retained as a secondary punishment. We have abundant proof, however, that colonising with 'rogues' alone, or even aggregating them in numbers disproportionate to the honest part of the community, is both a blunder and a crime. The expedient of scattering convicts over the face of the globe, smuggled under the name of exiles into colonies whose laws forbid their entrance as criminals, is an acknowledgment on the part of the executive of the principle of dispersion, on that of the colonists of their willingness to receive such men as labourers. At home it is found that the reformatory discipline *has* disposed friends and employers to receive again into their circle of society the convicted and chastised criminal. Other than our penal colonies might perhaps be induced to revise their laws, and permit the introduction of transports as labourers *in aid of emigration*; we all know that most of these are crying out for hands, and can we tell why those of the reformed criminal must be less useful at the Cape, in Canada, in New Zealand, than in Australia Felix?

But then the expense!—the expense! In our anxiety to save money,

money, we forget to look at the cost of our criminal population at home. Here, however, is Mr. Rushton, the head of the police department at Liverpool, ready to furnish us with the bill. He finds that the cost of fourteen young criminals who ran their career at home averaged at least 100 guineas a-head — independent of the expense of transportation for ten of them, and irrespective of the value of their depredations on the community:—while from 1833 to 1841 the total cost of seventy-seven boys put into the Reformatory Asylum at Stretton, was exactly 1026*l.* Of these seventy-seven boys, forty-one were effectually reformed:—

'If you divide the cost,' adds Mr. Rushton, 'by the number reformed, it will be found that whilst our Liverpool system has cost 100 guineas each case, and that ten of the fourteen have been transported, it has cost only 25 guineas in the asylum where forty-one out of the seventy-seven have been reformed.'—*Report on Crim. Law*, p. 192.

According to our present system of punishment, the prison-population is in a perpetual circulation of contamination and crime. First, poor, neglected, or brought up to the trade of crime; next, in custody and before the courts—thence to the prison and hulks, and from these again thrown among their old associates, till the same necessities and temptations once more reproduce them before the judge. In this way not less than 6000 of the present inmates of prisons in England and Wales have been committed each from four to ten times. In 1839 the exact number was 5573. The cost of each prisoner in our county-gaols is about 26*l.* a-year, or 10*s.* a-week. In the model-prison the net annual cost is 28*l.* per man, after deducting his earnings, or 33*l.* exclusive of such deduction. On these data Mr. Baker * has estimated the expenses charged on the country by a convict sentenced to ten years' transportation—say one of Mr. Rushton's juveniles, who had previously cost Liverpool 100 guineas in detections and prosecutions. This convict will cost, on an average—

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|---|---|
| Eight weeks in the county gaol . . . . . | £ 4 |
| Eight weeks in Millbank . . . . . | 4 |
| Passage to Van Diemen's Land . . . . . | 17 |
| Four years' maintenance in Van Diemen's Land | 80 |
| | £105 |

By the previous processes then he had cost 100*l.*, and it requires another hundred to transport him:—the sole advantage to the country his absence from it: the moral part of the question sunk altogether. Under the Separate System, including that eighteen

* 'A Plan for Emigration, for diminishing Crime and Misery, and for saving Public Money,' MS., which we trust may be rendered public.

months'



months' training at Pentonville which gives him so fair a chance of becoming an useful citizen, the cost will be just 242*l.*—the difference is forty pounds!

The old plan for cheapness was in one word—the gallows. That is happily over for the present. May not a more humane and not less efficient plan be found, viz.—abridge the costs by arresting the career? *Obsta principiis* is the soundest of maxims in criminal legislation. To effect this the arm of justice must still be terrible at first. The evidence of the Judges affords a striking unanimity as to the uselessness of short imprisonments; at least six months are asked, if you desire to reform the culprit; less than that is harmful. The arm of the law must also be strengthened, and Baron Parke and Mr. Justice Pattison suggest, as respects juveniles—1. To give magistrates a power of summary jurisdiction with the intervention of a small jury: the offender, his parents, or guardians, having the power of objecting to the jurisdiction, and electing a trial in the ordinary way instead. 2. To give the magistrate the power of sentencing to a term of imprisonment, a part of which term shall not be absolute, but capable of being diminished by good conduct in the gaol. A similar power, they think, should be given to the presiding judge or magistrate on an ordinary trial. (*Appendix*, p. 24.)

The treatment of convicts, after they have undergone the discipline of the Separate System, is offered by the executive to us under a twofold aspect. First, that of 'exile,' the history of which we have traced; and which saves all the expense of convict maintenance subsequent to deportation. Secondly, that of the 'gang system,' which, we believe, is in contemplation. It is, no doubt, hoped that, having previously undergone the discipline of the Separate System, the culprit will not deteriorate by being kept in constant communication with his fellows *alone*;—but experience is certainly against the hazarding this experiment. If such a mass of convicts be kept congregated, what the inevitable difficulties of management must be, may be learned from the evidence of the Bishop of Tasmania and others. The terror of their superintendents and the ferocity of the gangs of Van Diemen's Land may perhaps be mitigated, but cannot be annulled anywhere. If again they are to be fractioned and divided and scattered both at home and abroad, wherever public works are required, this limited dispersion will be less objectionable, but still it must be onerous and expensive. But there is yet another very serious point to be kept in view. If some 4000 or 5000 felons per annum are in future not only to be retained within our shores during their term of sentence, but on its expiration are to be at once let loose among us—the contemplation of such a nucleus

cleus of doubtful virtue among our population—a nucleus so rapidly swelling—is, we confess, somewhat startling. The unstained poor are struggling for occupation in our crowded community; is it likely that the branded and notorious gangsman will be received and trusted *ad eundem?* And if not, where is he? and what has he to do here, homeless in a crowd?*

Transportation, under a modified Assignment System, ought surely to be reconsidered. There is copious evidence that it was too hastily abandoned. It is by far the least costly to the government, and might be made highly beneficial to the criminal. In this last view Mr. Baker strongly urges that the punishment of transportation should be extended to a greater number of offences. The criminal population among us is well known: character, therefore, as some of the authorities in the Report have suggested, as well as the nature of the act, should determine the degree of the punishment. It might be competent to the executive either to give a convict in the first instance all the chances belonging to such an educational captivity as that of Pentonville, or at once to transport him to a colony: even in the latter case the man is rescued from the associations and temptations of his old career. Mr. Baker has no doubt that the cost both of the prison here and the voyage out would be gladly repaid by our colonists, on receiving an assignment for two years, in two yearly instalments —after which period and payments the convict would have acquired his pardon.

As to means subsidiary to and complementary of the Separate System, there is among the works heading this article one which deserves the most serious consideration, that of M. Bonneville, not only from its display of great practical knowledge, but from the curious similarity of views and plans with those elicited from our own judges by Lord Brougham's Committee. We would particularly call attention to M. Bonneville's chapter on *restitution*. Lord Denman had arrived at the same point:—'I would

* 'It appears that the chief town of Norway is so injuriously affected by the proportion which the liberated convicts bear to its population—nearly one in thirty—that the inhabitants have been called upon by the police to provide the means of their own security from such persons. In France, where between 7000 and 8000 convicts are liberated yearly, the superintendence of the police (surveillance) and the compulsory and fixed residence of the convict are found very insufficient, especially since the invention of railways. The residence of the liberated convicts is found to be a permanent danger to society. The system of imprisonment (reclusion), or of the Bagnes, or Travaux forcés, is of little effect in reforming or even in deterring from a repetition of the offences punished, and the proportion of those recommitted for new offences is not less than thirty per cent. Thus, of about 90,000 persons tried in the whole kingdom, above 15,000, or one-sixth of the whole number, had already suffered imprisonment, to say nothing of the corrupting effects produced on the community even by those who escaped a second punishment.'—*Second Report on Criminal Law*, p. 7.

(he



(he says) make restitution of the thing stolen, or its money-value, a part of the sentence. This principle might be usefully adopted in all cases of loss by theft or fraud.' It has been enforced ever since 1803 by the codes of Austria, Sardinia, and Baden; and, it seems, with excellent results. Let the English thief too be made to know that, besides the punishment due to the moral offence as expiatory, he must bear the burden of reparation also. In France the thief generally buries his stolen money, and, if convicted and sent to prison, returns after a few years to his treasure, increased by his earnings during detention. With us the receiver of stolen goods makes over his spoil to relatives, who are often rich; and thus escaping forfeiture, it is remitted to him after he had been transported—at once converting the convict into the Australian capitalist. Civil restitution is perfectly feasible in all this class of criminals. In others of less capital, either the guilty person will disgorge, or, if he have spent the money, his friends will come forward to his aid.* The seeming injustice of thus mulcting innocent connexions is to be met by its not being compulsory, and by the right it gives the reliever to control the man in future. The absolute insolvent, who cannot otherwise repair the loss occasioned by his depredations, should do so by the sweat of his brow. Until he has done that, he can have no right to consider his labour as his own.

Education has now most wisely been viewed in connexion with ts bearings on crime. We have seen what it does for the convict of Pentonville. A wise system would not only furnish principles of conduct, but hold out some assured prizes for which all could contend (and all bettered for the conflict), and which some would attain. Our forefathers understood this: their foundations and grammar-schools carried the boy into manhood, and furnished him with the prospect of a competence. These have, from the rise in the value of property, attracted the cupidity of the richer classes, who have in too many cases usurped the advantages meant for their humble brethren. Our parish schools, excellent though they be, give no such hope as lighted up the vista of a life from youth to old age in our monastic institutions. The charity-boy must shift for himself—he may or may not succeed in the scramble of life—but there is no hand to help him on but his own. A broader charity is wanted—a charity founded not in the despairs but in the hopes of our nature—which will cheer the heart in the heat and struggle of the battle, and will not wait to open for disappointment and decrepitude the asylum

* A very large annual surplus is left, after paying all the expenses of our recruiting department, from moneys raised by the *poor* relations of soldiers for the purchase of their relatives' discharge.

and

and the almshouse. Among our liberties give these the Liberty of Hoping. Can there be no un-penal Parkhurst for the offspring of Honest Poverty? Is that splendid institution to be the appanage only of the vicious? You have begun to provide for your soldiers in your colonies, and the view of the few thus cared for animates and strengthens the whole class. Extend the principle to the poorer classes generally, and a very few prizes thus offered to those who will qualify for it may do more to popularise education than any mechanism of Bell or Lancaster.

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ART. IX.—*The present State of the Currency practically considered.* London, pp. 76. 1847.

THIS pamphlet contains a reprint of Articles (some of them very ably written) on the monetary controversies arising out of our still continued commercial distress, which have appeared in the Morning Post, the Morning Chronicle, and the Standard. We might also have placed at the head of our paper the titles of some dozens of new pamphlets on the same topics—embracing as many different views of them. These discussions seem to leave the contest as hot as ever. We have so lately taken our own share in it that we may be excused for not entering into the thick of the battle again just as yet. But it has occurred to us that we might perhaps contribute an acceptable service by throwing together a few remarks on a branch of the subject, which, though of the most vital importance to the general issue, has appeared to us to be very much neglected in most of the disquisitions which have fallen under our observation; we allude to that circle of causes which, under all systems and in all states of the currency, is for ever at work to disturb from time to time the even tenor of commercial credit and adventure, and from the operation of which, in producing occasional monetary crises of greater or less intensity, we can scarcely hope that any legislative precautions will ever entirely protect us.

Every one who has considered the subject will be aware, that when the world, or a nation, or an individual, engaged during any period in production, has replaced what has been consumed, and restored what has been dilapidated during the production, and has beyond this produced more, the world, the nation, or the individual, has created what may (in a phrase universally understood) be called fresh capital. We will take the simplest illustration which occurs to us. A man lives by the



were quite inadequate to his purpose. However, until another and better work on the subject of physiological chemistry makes its appearance, Dr. Day's treatise will obtain circulation, and will not be worse by reason of the exhibition which we felt ourselves bound to make of its greatest errors.

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REVIEW IX.

1. *On the Air of Towns.* By Dr. R. ANGUS SMITH.
2. *Articles "Putrefaction" and "Sanitary Economy" in 'Ure's Dictionary of Arts, Manufactures, and Mines.'* By Dr. ANGUS SMITH.
3. *Variabilités Normales des Propriétés de l'Air Atmosphérique.* Par M. HOUZEAU. ('Comptes Rendus,' vol. lii. No. 16, p. 809.)
*On the Normal Variations of the Properties of Atmospheric Air.* By M. HOUZEAU.
4. *Expériences relatives aux Générations Spontanées.* Par M. PASTEUR. ('Comptes Rendus,' vol. l. p. 303).
*Experiments relating to Spontaneous Generation.* By M. PASTEUR.
5. *De l'Origine des Ferments.* Par M. PASTEUR. ('Comptes Rendus,' vol. l. p. 849.)
*On the Origin of Ferments.* By M. PASTEUR.
6. *Moyens de rassembler dans un très petit Espace tous les Corpuscules normalement invisibles contenus dans un Volume d'Air déterminé.* Par M. POUCHET. ('Comptes Rendus,' vol. l. p. 748.)
*Method of collecting the Corpuscles contained in a given Volume of Air.* By M. POUCHET.
7. *Genèse des Proto-organismes dans l'Air Calciné, &c.* Par M. POUCHET. ('Comptes Rendus,' vol. l. p. 1014.)
*Genesis of Proto-organisms in Calcined Air, &c.* By M. POUCHET.
8. *Études Microscopiques de l'Air.* Par MM. JOLY et MUSSET. ('Comptes Rendus,' vol. l. pp. 647 and 934.)
*Microscopical Studies on the Air.* By MM. JOLY and MUSSET.
9. *Papers relating to the Sanitary State of the People of England.* By E. H. GREENHOW, M.D. Presented to Parliament by command of Her Majesty.—*London*, 1859.
10. *Reports on the Prevalence and Causes of Diarrhœa at Coventry, Birmingham, Wolverhampton, &c. &c.* By the same Author. ('Second Report of the Medical Officer of Health to the Privy Council.')—*London*, 1860.

THE art of hygiene is not based on any special science of its own; it is merely the application to practical ends of principles derived from sciences which have no necessary relation with it. Its purpose being to protect man from the influence of those abnormal conditions of the world outside of him, which give rise to irregularities in the performance of his vital functions, it is clear that the solution of its problems can require no other knowledge than that of the science of life or phy-

siology on the one hand, and of chemistry and physics on the other. From the latter we learn the *nature* of those causes which pervert healthy functions; from the former, the *mode* of their operation.

It must be acknowledged, that although the applications of science to the art of prevention seem to be more direct and more simple than to the art of cure, hygiene is more empirical, that is to say, less under the control of science, than practical medicine; and this is a natural consequence of the fact that the impulse which hygiene has received during the last twenty years has been communicated to it entirely by the energy and zeal of practical men, and that it owes its present position not to the advance of scientific knowledge, but to the development of social life, and particularly of the social life of great towns. As therefore science has had so little to do in the recent revival and progress of hygiene, it is not to be wondered that she is often unduly excluded in the discussion of sanitary questions, or that she is sometimes unprepared to solve them when submitted to her.

In so far as hygiene is in this position it must be stationary, for an art can only progress by being brought under the dominion of knowledge. In the absence of that control, its history can be no more than that of a succession of trials and failures. But there is no reason why such a state of things should continue; now that sanitary art has taken the form of a system of practical principles or precepts, there is no reason why science should not act upon her evident competency to *judge* of these principles, not only in discriminating between the false and the true, but in distinguishing what is proved and certain from that which is merely presumed.

It is our purpose to show the application of this criticism to a subject which more than any other in the range of hygiene has hitherto been withdrawn from it, by bringing together all those results of scientific investigation during the last few years which bear upon it, and examining in their light the principles which have hitherto guided us. The public, led by the medical profession, has accepted, as established, doctrines relating to the production of diseases, which although not proved to be erroneous, have no certain foundation; such, particularly, as that which attributes the origin of specific morbid poisons to putrescence. To speak plainly what we know on this and similar questions seems to be now more than ever a necessity. We have in London a gigantic scheme in progress for the purification of the river, and the public look forward to its completion in the hope that the millions it has cost may be repaid at least in hundreds of human lives. If, as the most thoughtful among us believe, there is no scientific ground for anticipating such a result, it is surely time that we should say so; and that we should make it plainly understood, if for no better reason than to save ourselves and the science of medicine from the discredit of failure, that the septic theory, although containing a kernel of truth, has not yet received in any definite form the sanction of science.

The external conditions of life which are liable to be modified by the disturbing influences of habitation are exclusively those of air and food.



It is to the modifications of the former, as taught us by physical science, and particularly to those which exercise so unfavourable an influence on the health of town populations, that we propose to confine ourselves.

*Chemical and physical modifications of the atmosphere consequent on habitation.*—The repeated observations of chemists have taught us to regard the identity of composition of the atmosphere as a fixed law—one to which no exception is to be found in nature, unless it be in the neighbourhood of tropical rivers, where vast quantities of organic matter, the *débris* of a luxuriant vegetation, are rapidly passing into decomposition.* Everywhere, whether collected on the top of Mont Blanc, on the banks of the Seine or Thames, or in the middle of the Atlantic, the two main constituents of the atmosphere are found in precisely the same proportion, and the more perfect the processes of analysis have become, the more firmly has the constancy of this relation been established.† This fact has always, however, been rebelled against by the common experience of mankind; it has been almost an opprobrium to science that, in spite of the manifestly different *feeling* of the air on the Swiss mountains and in the middle of London, the chemist can detect no difference in composition. During the last few years, several chemists have directed their attention to this apparent inconsistency between the organoleptic and physical characters of the air with special reference to the condition of the atmosphere in towns. These researches have related mainly to the quantity of carbonic acid, and other products of combustion, and to the existence of organic matter in suspension. Among the most important are those of Dr. Dundas Thomson and Dr. Angus Smith.

The percentage of carbonic acid usually existing in the air of London was found by Dr. Roscoe,‡ to be 0·037 per volume, a result not differing materially from those obtained by Dumas and Boussingault in Paris. The analyses on which these are based were made by passing a known volume of air over weighed tubes containing alternately pumice-stone steeped in sulphuric acid and potash, a method which leaves nothing to be desired in respect of accuracy. Dr. Smith's estimations of the carbonic acid of the air of Manchester, made by the same method, give somewhat higher results. He found that on a windy day, they averaged from 0·045 to 0·08 per cent., and that on a still day the per-centage amounted to 0·12. When, however, we consider that although London is the greatest city in the world, Manchester is the largest manufacturing town, and that it is the centre of a manufacturing district comprehending many hundred square miles, over which an atmosphere darkened by smoke perpetually hangs, we are not surprised to find that the products of combustion exist in larger proportion than in London or Paris. Dr. Smith has calculated from the quantity of coal burnt in the neighbourhood of Manchester, that

* Daniell: Philosophical Magazine, fifth series, No. 121.

† Dumas and Boussingault: Récherches sur la véritable Constitution de l'Air: Ann. de Chimie et de Physique, troisième série, tom. iii. p. 257. 1851.

‡ Roscoe: On the Atmosphere of Dwelling-houses: Quarterly Journal of the Chemical Society, Oct. 1857, p. 259.

15,000 tons of carbonic acid must be introduced into the atmosphere daily, without taking into account the quantity expired by man and animals.

A much more important product of combustion is derived from the oxidation of the sulphur contained in coal, and the introduction thereby into the atmosphere of sulphurous and sulphuric acids. In the researches undertaken by Dr. Thomson* during the last epidemic of cholera, which consisted in passing large quantities of the air of London through distilled water, it was found that such air invariably possessed an acid reaction, and that this reaction was due to sulphuric acid. Dr. Smith has further investigated this question, and has found that in Manchester the acid reaction of the atmosphere is much more constant and intense than in London. Blue litmus paper becomes red in half an hour, and sometimes in ten minutes when exposed to Manchester rain, and occasionally its acidity is such that a single drop is sufficient to effect the reaction. The actual quantity, however, is exceedingly small; of a solution containing 1000th part of its weight of carbonate of soda, quantities varying from ten to fifty grains suffice to neutralize 1000 grains of such rain; and as much cistern water is found to be neutralized by twenty-five grains; from which results Dr. Smith concludes that the largest quantity of sulphur acids existing in the atmosphere of the town does not exceed 0·004 per cent. by weight, a proportion amounting to not more than $\frac{1}{20}$th part of that of the carbonic acid. As to the share of sulphurous and sulphuric acids respectively in this total, it is of course impossible to arrive at a conclusion; but considering what we know of the rapidity with which the former is oxidized in the air, it is to be supposed that whenever the acidity of the atmosphere is marked, it will be mainly owing to the latter. The impregnation of the rain with a mineral acid must be regarded as rather beneficial to health than otherwise, as tending to retard the putrefaction of animal matter on which it falls.

Dr. Dundas Thomson appears to have been among the first to recognise the importance of *organic matter* as a constituent of the air of towns, and to express the conviction that the gaseous products evolved during putrefaction are not the main sources of danger. Proceeding on this idea, he subjected a large quantity of atmospheric air to chemical investigation, "with a view of condensing any vapour, or detaining solid particles, which might be disseminated." The result was entirely negative.† Further inquiries of the same kind were made, under the sanction of the Board of Health, in 1854, the air being passed, as has been already mentioned, through distilled water, the result invariably being that hyphaceous fungi made their appearance in the water, and in a short time, by their rapid growth, pervaded the whole of it, so as to be evident to the unassisted eye.‡ It

* Appendix to Report of the Committee for Scientific Inquiries in relation to the Cholera Epidemic of 1854, p. 119.

† Chemical Researches on the Nature and Cause of Cholera: Medico-Chirurgical Transactions, vol. xxiii., 1850.

‡ Report on Cholera, p. 127.



was also found, that on passing the air through sulphuric acid in the same manner, the acid became soon dark-coloured, in consequence of the charring of the organic matter introduced into it. Dr. A. Smith has worked out the idea much more completely. He has preferred a chemical to a microscopical test for the detection of the suspended organic matter. It consists, as most of our readers may be aware, in passing the air through a very dilute solution of permanganate of potash, the strength of which is determined by ascertaining how much is required to decompose a solution of a weighed quantity of oxalic acid, or of uncrystallizable sugar. This test obviously indicates, not the quantity of organic matter, but the quantity of oxidizable matter in the atmosphere, and hence it is only valuable in so far as we may assume that the atmosphere contains no reducing agent. Thus, in the presence of sulphurous acid, it would be of little value were it not that that agent exists, even in town air, in exceedingly small quantity. Many of Dr. Smith's results are of such a nature as to be beyond the possible limits of this source of error. It was found that the same quantity of the solution of permanganate which was decolorized by one bottle of air obtained in a close court in Manchester, required twenty-two bottles to decolorize it on the hills in the neighbourhood. Assuming that sugar and the organic matter of the air are decomposed by the same amount of manganate, "a supposition which cannot be perfectly true, but which, from the minuteness of the amounts, leaves no room for a great error," Dr. Smith concludes that whereas, on the high grounds north of Manchester, there existed but one grain of organic matter in 200,000 cubic inches; in close places in the town there was a grain in 8000 cubic inches. From his most recent observations he concludes that we have, "in different air breathed by people in the same county, a substance the amount of which in one case is twenty-two times greater than in the other, and in air breathed by people in the same town a difference which is as 9 to 22."

The whole importance of these investigations, regarded from the point of view of preventive medicine, lies in their relation to the putrefactive process. To discover a means of seizing upon and estimating putrid exhalations—under which term we include everything not gaseous that is disengaged into the atmosphere from the surface of living animals, no less than the exhalations from dead animal matter—would be certainly a most important step towards acquiring a more satisfactory knowledge of the influence of habitation on health. We have, therefore, to inquire what grounds there are for regarding Dr. Smith's test, or any other founded on a similar reaction, as affording a solution of this problem. It is not difficult to satisfy ourselves that animal matter in putrefaction does disengage from its surface portions of its substance of sufficient tenuity to be suspended in the atmosphere. Without referring to offensive smells, which of course must be material, we have several satisfactory proofs. If a bell-glass be inverted over decomposing animal matter in a moist condition, the inner surface of the glass becomes in a few days bedewed with moisture, which on being examined under the microscope is found to contain the

same filamentous fungi to which reference has already been made, and on evaporation it leaves a residue, which is blackened by incineration. Similarly we find that the moisture which is deposited in glutinous drops on the sides and arched roofs of sewers, is rich in organic matter, which must clearly have been derived from the air of the sewer. Dr. Smith has related the results of experiments showing that air kept for a length of time in contact with putrescent matter becomes loaded with oxidizable material, and acquires the power of decomposing a correspondingly large quantity of permanganate of potash.

Another group of facts shows us that the existence of putrescent impurity in the air is a principal, though not a necessary, condition of the induction of putrefaction in bodies susceptible of the change. Thus, for example, I have found that milk which has retained its freshness for hours, will at once turn on being exposed to a putrid emanation. Butchers are familiar with the fact, that meat cannot be successfully dressed in the neighbourhood of a stinking gully grate, or of a stable reeking with ammonia; and for the same reason every intelligent butcher keeps his slaughter-house in a state of scrupulous cleanliness. It is not, however, to be forgotten that other causes, possibly electrical, the nature of which is still involved in obscurity, have a still greater influence in inducing putrefaction. Thus, in this country, the butcher finds that on one day he is able to slaughter and dress even veal or lamb with safety; whereas on another, not differing in temperature, incipient putrefaction may render the carcase unsaleable, in spite of the most careful precautions; butchers are apt to believe that this occurs mostly on calm days when the air feels heavy. Still more remarkable are the facts recorded respecting the slaughtering of cattle in hot countries; the operation can only be safely performed when the air is clear and the sky cloudless. Under such circumstances, we are told that the appearance on the distant horizon of a cloud "like a man's hand," the sure precursor of a storm, is a sign to the slaughterers on the Pampas of South America to desist from their work, for it is immediately followed by rapid putrefaction.

Air contaminated with putrescent matter is for the most part alkaline. Thus, the air of sewers is invariably so, as has been proved by the experiments of Dr. Dundas Thomson, its alkalinity being owing partly to ammonia, partly to sulphuret of ammonium, the form assumed by the sulphur disengaged in the decomposition of fæcal matter. The air of stables and stable dwellings is strongly alkaline, as every one in attendance on the sick poor in London well knows; and the air expired by men and animals, although at first probably acid, rapidly becomes alkaline by putrefaction. The relation between putrefaction and the existence of ammonia in the air is therefore so close that the detection of this body may under ordinary circumstances be regarded as a proof of its existence.

*Bleaching power of the air.*—It is known to those who are commercially engaged in air-bleaching, that the bleaching power of the air varies very considerably, not only according to the season and time of day, but irrespectively of such periods. It has not yet been determined what is the relation between this reaction and the oxidizing power of the air, as exhibited in its power of decomposing iodide of potassium. But the remarkable experiments of M. Houzeau (*loc. cit.*), made simultaneously in town and country, have shown that country air bleaches much more rapidly than town air, and that in this respect the difference is no less marked than in that of the well-known ozone reaction which has been so clearly shown to be destroyed by urban contaminations.



The *pressure, temperature, and moisture* of the air are but little modified by habitation. The readings of the barometer and hygrometer in town and country do not differ. There is, however, one respect in which the temperature of great towns may be favourably compared with that of the country—viz., in that of equability. This subject has been very fully illustrated by Mr. Glaisher,* in his report on the meteorology of London during the year 1854; and more recently by Professor Hennessy in a paper read last year to the Association for the Promotion of Social Science. Mr. Glaisher found that in the middle of London, the night temperature is much higher, and the day temperature considerably lower, than in the country, and consequently that the range of daily temperature is nearly twice as great in the country as in London, especially in clear weather, when the cloudless sky of the country contrasts with the smoky obscurity of town. This immunity from great variations of temperature must tend to diminish, though probably it does not at all counterbalance, the generally injurious effects of town air on persons affected with chronic pulmonary disease.

In the preceding paragraphs we have reviewed all the differences which are discoverable either by physical or chemical means between the atmosphere of towns and that of the country; and we are in a better position to determine in the light of physiology which of these conditions is likely to exercise most influence on the health of man. As regards the existence of an excess of carbonic acid, it is clearly of no importance whatever, for in many large towns no such excess is met with. Sulphurous and sulphuric acids, if they have any influence, must act as "colytics"—*i.e.*, as agents tending to arrest putrefactive change. The absence of sunlight, on which the more equable temperature of towns depends, has unquestionably an unfavourable influence, but one which is very limited. We are driven then to the only difference which remains—viz., that which depends on the existence of oxidizable matter, as indicated by its power of reducing certain metallic oxides.

*Modes of Investigation.*—From the preceding considerations, and from others belonging rather to the pathological aspect of the question, we have ground for believing that *periodical observations of what may be called the septicity of the air, that is to say, its power of exciting putrefaction, would lead to most important results as regards the causation of disease.* We cannot as yet identify the existence of putrescence in the air with its reducing power, but considering that the former pro-

* Report upon the Meteorology of London. Report on Cholera Epidemic, 1854, p. 21.

perty includes the latter, it is clear that in the possession of an accurate means of determining the one, we have gained an important step in the investigation of the other. The remarkable researches of Schröder* 'On the Filtration of the Air in relation to Putrefaction, Fermentation, and Crystallization,' seem to us to contain another indication of the method by which this investigation might be accomplished. At all events his discoveries are of much importance in relation to our present inquiry. Schröder found "that almost any organic body, heated to boiling in a flask loosely plugged with cotton while hot, remains for months and years altogether unaltered, although the air, after filtration through the cotton, has free access." Hence he concludes that the atmosphere contains "an active substance, which induces the phenomena of fermentation and putrefaction, and which is decomposed by heat and arrested by filtration." His researches "establish beyond doubt that the formation of fungi in fermentation and putrefaction takes place exclusively by means of germs conveyed by the air, and that these are arrested by cotton."

Pasteur, in researches undertaken with a view to the question of spontaneous generation, has repeated and extended the experiments of Schröder. He filtered a large quantity of air through gun-cotton, which he afterwards dissolved in alcohol containing ether. On allowing the solution to stand twenty-four hours, and carefully collecting the deposit for microscopical examination, he found that it contained, along with a few starch granules, numerous corpuscles, "the form and structure of which indicated that they were organized." The agency of these corpuscles in exciting fermentation and putrefaction was proved by several series of experiments of the following nature. A flask containing a solution of sugar, to which about half a per-centage of yeast had been added, was placed at a constant temperature of about 87°, after having been previously boiled and filled with air which had been passed through a red-hot platina tube. It was found that no change whatever took place in the liquid, even after remaining many weeks at the temperature of fermentation, so long as the flask was hermetically closed, but that as soon as a little bit of cotton which had been employed as an air-filter was introduced, both *mucedines* and infusoria appeared at the end of from twenty-four to thirty-six hours. These experiments were variously modified, with similar results. Thus asbestos was substituted for cotton, and it was found that neither substance produced any effect on the liquid, unless it had been employed as an air-filter. It was further found that a fermentescible liquid could be kept open to the air without fermentation for an indefinite period in a long-necked flask, the neck of which was bent horizontally, provided that the liquid had been previously boiled, so as to expel the air, and destroy the vitality of the germs it originally contained; but that if the neck were cut off below the bend, fermentation would at once commence. This experiment seems clearly to show that the action of the air on fermentescible liquids is exclusively due

* Liebig's Annalen, Band cix. Heft 1.



to its corpuscles. In extending the same mode of investigation to urine, the author found that putrefaction was subject to precisely the same conditions as fermentation, and influenced in exactly the same manner by the presence or absence of the solid particles suspended in the atmosphere.

M. Pouchet has investigated the corpuscles of the air by a different method, and has arrived at somewhat different results. His plan is to direct an extremely minute but rapid current of air against a flat disk of glass. The air corpuscles are deposited on the glass "by precisely the same mechanism that the particles of metal are deposited on a porcelain plate in Marsh's apparatus," forming a little spot not more than a millimetre in diameter. The glass is then placed under the microscope. M. Pouchet denies the existence in the air of any bodies which can be proved to be germs or ova, and endeavours to throw discredit on the researches of Pasteur and others, without, however, advancing any experiments tending to show that their results are erroneous.

Enough has been already advanced to render it probable that the investigation of the property of the air to induce fermentation or putrefaction in liquids susceptible of those changes, or—if we may be permitted to coin a word—its *septicity*, must be of the greatest importance to hygiene. Whatever theory we may be disposed to adopt as to agency of germs or *ova*, it is clear that useful results would be obtained by making continuous observations on the variations to which this reaction is liable, and the effects of such variations on health. Pasteur's and Schröder's experiments suggest the method. A solution of urea or cane-sugar containing a ferment, and maintained at the proper temperature, might be subjected to the action of the atmosphere at different places and periods, and the time required for the induction of alkalinity in the one case, or for the development of carbonic acid in the other, noted.

Another most important line of investigation arises from the fact already stated, that ammonia exists in the air as a result of putrefaction, and will be found in quantity proportionate to that of the organic septic products. This research has been hitherto rendered impossible by the absence of a chemical method applicable to the purpose; but recently a reaction has been discovered which renders it possible not only to prove the existence of ammonia in the air with facility, but to determine its quantity with great accuracy. It is probable that this may afford a means of serial observation on the quantity of ammonia contained in the air at different times and under different local conditions, and may thus have an important bearing on the questions under our consideration.

*Sources of organic impurity in the air.*—It is evident that, with the exception of graveyards and certain manufactures of which putrescence is the raw material, the insufficiently rapid removal of solid, liquid, and volatile excreta is the exclusive source of the contamination of the air with septic impurities; and that so to accelerate their removal

that the putrefactive change shall not have time to commence, is one of the most important problems in the hygiene of habitation.

That part of the problem which relates to the removal of solid and liquid excreta comprised under the general term sewage, has been generally discussed on grounds so entirely apart from the domain of hygiene, to which it of right belongs, that one is disposed to assume an apologetic tone in introducing it. But there is no subject outside of the pale of science, and no question, however practical, which will not be better and more fruitfully discussed in the light of knowledge, and with the desire to attain to truth, than in any other light or with any other object.

The danger arising from any atmospheric contamination varies inversely as the rapidity of its diffusion. Malaria in a valley is more dangerous than on a plain, and so what is harmless in the open country may be perilous in a pent-up court in London. A slight pollution in the streets is worse than the foulest stink in the river, and an almost imperceptible taint *in* the house is far more to be feared than the most offensive open sewer grating outside. It is therefore more important to eliminate sewage and all the products of its decomposition from our houses, than to get rid of it in the streets or in the river; but this is precisely what is most difficult to accomplish. From common experience we know that sewer air very frequently enters our houses, and from experimental investigation* it can be shown that there is during the greater part of the year a constant difference of pressure between the house and sewer atmosphere, and that consequently the air of the sewer, impregnated as it is with organic impurity, passes in a continuous stream by every available chink and crevice from the one to the other.

In Paris and Berlin, where they are so much behind us in their practical appreciation of the value of a wholesome and comfortable dwelling, they have taken time to profit by our experience, and seem to be little disposed to follow our example. The so-called sewers with which one-third of the streets of Paris are provided, are not sewers in the sense in which we understand the term; that is, they contain no "sewage," and are intended merely for the conveyance of liquids, whether excremental or otherwise. From a recent report, it appears that the system now generally adopted in Paris for the removal of solid and liquid excreta is that of moveable *séparateurs*. The *séparateur* is an iron box open at the top, and the sides of which are perforated with numerous holes, the purpose of which is to retain all solid matters, and to allow all liquids to percolate into the sewers, by which they are conveyed into the river. It is so fixed as to be easily removed and reinstated; and it is said that this process occupies only ten minutes, and gives rise to no annoyance whatever, the full boxes being placed immediately on their removal in an air-tight case for transportation.

The *séparateur* system not only prevents in great measure the pollution of the river, but is entirely free from the much more serious

* Quarterly Report on the Health of Paddington, Christmas, 1861.



drawback to which the system adopted in London and other large English towns is liable, arising from the existence of an impure subterranean atmosphere of immense extent, the tension of which is generally greater than that of the houses, so that it tends to make its way into them by every chink and crevice. However perfectly a sewer intended for the conveyance of solid matters may be constructed, it must necessarily be of sufficient size to allow of the entrance of workmen. But in London and other large towns the older sewers are not only much larger than necessary, but from their form and the mode in which they were built, are to be regarded rather as depositories of sewage than as mere channels for its conveyance. So much expense has, however, been incurred within a recent period on works of this nature, that no departure from the present system is to be thought of. It remains to the hygienist, after having pointed out the unavoidable evils connected with it, to devise the best means of diminishing or counteracting them. There are obviously only two ways of preventing the contamination of our houses by sewer-air—disinfection and ventilation. There can be little doubt that the introduction into the house-drains either of substances capable of arresting putrefaction—such as the mineral acids, creasote, and carbolic acid—or of substances capable of rapidly decomposing and destroying putrescible matter, such as chloride of lime, would be attended with the most satisfactory results. When, however, it is considered that the evil to be remedied appears to most people imaginary, there is little ground for hope that an expedient, the use of which could not be unattended with trouble and expense, would ever be so generally adopted as to be useful.

The difficulties of ventilation are equally great. In the ventilation of a house-drain the object we have in view is to diminish the tension of the air which it contains in such a manner that air shall tend to enter it by all existing openings, instead of passing out of it, as at present. How to effect this is a difficult problem. The measure which at once suggests itself is that which is adopted in coal mines—viz., to connect with each system of sewers a heated up-cast shaft of sufficient height to exhaust the foul air, and at the same time disinfect it by combustion. It is often imagined that if this were carried out, the evil would be remedied; but, on more careful consideration, it is evident that a system of sewers, not being a closed cavity like a coal-mine, but one which is interrupted by a multitude of openings through its whole extent, is not capable of being exhausted in this manner, any more than it would be possible to produce a vacuum with the air-pump in a perforated receiver; and experiments have shown that the effect of a ventilating shaft is in fact limited to the sewer with which it is immediately connected.

All that remains, therefore, to be done in the absence of any system either of ventilation or disinfection of general applicability, is to substitute well-constructed drains of impermeable material, in all possible cases, for those of brickwork; and in every instance to provide for the free access of the external air to the space under the house through which the drain passes, so as to reverse those physical con-

ditions on which, as we have seen, the escape of sewer-air immediately depends.

*Disease dependent on septic contamination of the air.*—We may now proceed to inquire what are the diseases to which the existence of organic matter in the atmosphere gives rise, bearing in mind that our purpose is not to establish its generally injurious effect, but rather to limit and define its mode of operation in accordance with the facts of pathology. Nor, on the other hand, must it ever be forgotten, in such an inquiry, that other causes, rather moral than physical in their nature, are in powerful operation in towns, such as the luxury of the rich and the vicious recklessness of the poor—the neglect of maternal duties, arising from improvidence or the employment of mothers in manufactures; and, above all, the exhausting strain of the energies of the mind in the struggle for existence, all of which are inseparable from the social life of great cities, and tend to depress the vitality of their population.

There is no worker who has thrown more light on the question before us than Dr. Greenhow. He has shown by a large and laborious investigation, what others only surmised, that we have hitherto attached far too much importance to the so-called zymotic disease as indices of the agency of local causes of unhealthiness. The facts which he appears to have established are the following: 1. That there is no constant relation between the general prevalence of disease and the mortality arising from acute specific diseases; that is, diseases dependent on specific morbid poisons. This inference is derived from a comparison of the mortality arising from each of the diseases in question with the total mortality in urban and rural populations inhabiting all parts of England. The comparison yields the same result in every instance excepting that of measles, which owes its danger to pulmonary complications induced by local causes; and that of small-pox, of which the mortality varies with the neglect of vaccination. From scarlatina nearly the same average annual proportion of deaths occurs in the most salubrious districts as in the most unhealthy towns; while as regards fever, there is no marked difference between London and the country, some rural districts being subject to mortality from this cause considerably higher than the metropolis. On this point, however, it must not be forgotten that statistics are rather uncertain, no distinction being made between fever which is specific and contagious, and that kind of fever which has no fixed duration, no capability of reproducing itself, and (as we believe) derives its character as well as its origin from septic impurity, or, to use Dr. Murchison's word, is pythogenic. 2. The second fact is, that the three groups of diseases which Dr. Greenhow has designated as "pulmonary affections, alvine flux, and the nervous diseases of children, are both absolutely and relatively the chief causes of high death-rates." The mortality from each of these causes is subject to enormous variations, and these variations exhibit an obvious coincidence with the aggregation of life in large towns. Thus, in Liverpool these diseases occasion 54·6 in every 100 deaths; while in Glendale, a rural district, they constitute only 34



per cent. of the total mortality. The nervous disorders of infancy exhibit an even greater variation. Whereas only 25·8 per thousand die annually of these diseases in the most healthy rural districts, 383 per thousand die in some manufacturing towns. The variations of the infantile death-rate from pulmonary disease are no less striking, though not so enormous as those above stated. Both are clearly dependent on the poisonous in-door influences which act so powerfully on infantile life in towns.

Since the publication of the work from which I have been quoting, Dr. Greenhow has completed another inquiry relating to the local causes of diarrhœa. The mortality from profluvial diseases varies enormously. The largest, according to Dr. Greenhow, occurs in Liverpool, where it amounts to 6·8 per thousand; the smallest in Aberystwith, where it is only 0·4 per cent. But there are many other places from which these diseases, so fatal in towns, are in fact absent. The inquiry has very clearly established the existence of two local causes as accounting for these enormous differences—"the breathing of an atmosphere tainted with the products of animal decomposition," and "the drinking of impure water. The former of these causes is the more prevalent; and the mortality has, with few exceptions, been nearly in exact proportion to its intensity."

It would be wholly impossible within the limits of this paper to place Dr. Greenhow's facts before the reader in a satisfactory manner—facts which would have been better known to the profession than they are, had they not presented themselves in the forbidding garb of a Parliamentary blue-book. Whatever allowance we may be disposed to make for possible error or uncertainty, the conviction is forced upon us that the supposed analogy between the organic impurity of the air and the diffusible virus of contagious disease has entirely misled us in our attempts to estimate the influence of such impurity on health; that it is not only *not* proved that contagious diseases are called into existence by a septic ferment, but that there is strong reason for believing, on the contrary, that putrescent matter in the air exercises its pernicious influence, not by reproducing itself in the living organism after the manner of a specific virus, but by depressing or impairing the functions of the whole body, and particularly of those organs with which it is brought into contact, manifesting itself constitutionally by fever accompanied by prostration; locally, by affections of the respiratory and digestive mucous membranes.

## Review X.

*The History of Medicine.* By Edward Meryon, M.D., F.G.S. Volume I.—*London.*

The want of a history of medicine which should be at once sound and popular, has been long felt. Le Clerc's history, with Freind's continuation, is obsolete; Sprengel's work is too voluminous for the great mass even of the professional public; and articles in cyclopædias or special monographs on particular subjects are no proper substitute for a summary of facts. Perhaps the want is even greater for the public at large, who are practically reduced to incidental notices in non-professional writers like Hallam and Buckle, than for physicians. A sound view of the growth of medical science would go far to dissipate the gross errors which still prevail among men otherwise educated. That medicine has shared the fortunes of experimental science generally, and has advanced, *pari passu* at least, with our common civilization, is a truth that would scarcely need demonstration if it were not constantly doubted or denied. The mitigation of epidemic disease, in spite of the enormous growth of population, and the greater averages of life at a time when the sickly as well as the strong grow up, are facts which ought to outweigh the many palpable deficiencies that still exist in our therapeutics. But the ravages of the Black Death or the Plague are little remembered by those who witness cholera, and by a singular anomaly, a failure to deal with chronic disorders is regarded more leniently than the inability to arrest those stages of collapse which are rather the beginning of death than disease. An irrational scepticism is commonly associated with a baseless faith; and if the quackeries of our own time are moderated by the public opinion of a powerful professional body, the success they achieve is in a greater contrast with the real advance of the century than it was in the days of Bishop Berkeley and Mead. A belief in tar-water was more rational a hundred years ago than the belief in infinitesimal medicines is now.

These are strong reasons why a book professing to give the history of medical delusions and progress should be welcomed as an addition to literature, if it fairly achieved its purpose. It is unfortunate that Dr. Meryon's book fails to do this. He appears to have read widely, but it is clear that he has not sufficiently thought out his subject. He is ignorant of many points of general history to an extent that is sometimes almost incredible. His style shows want of care in many parts, and the clerical errors still uncorrected are numerous and important. Above all, he starts from no definite idea, and follows no regular plan. His book is neither a history of scientific progress, nor of the lives of physicians, nor a record of disease, but is a patchwork of all these. Names and facts are so accumulated as to weary the eye and mind, and a passage from one authority frequently contradicts or modifies a previous assertion taken from another. We are sensible that there is great reason to excuse defects in a work



Art. VI.—1. *On Warming and Ventilating; with Directions for Making and Using the Thermometer Stove, or Self-Regulating Fire, and other New Apparatus.* By Neil Arnott, M.D., F.R.S., &c. London, 1838.

2. *Journal of the Society of Arts*, Vol. II. No. 77. *On a new Smoke-Consuming and Fuel-Saving Fireplace, with Accessaries insuring the healthful Warming and Ventilation of Houses.* By Neil Arnott, M.D., F.R.S., &c. 10th May, 1854.

3. *A Rudimentary Treatise on Warming and Ventilation, being a concise Exposition of the General Principles of the Art of Warming and Ventilating Domestic and Public Buildings, Mines, Lighthouses, Ships, &c.* By Charles Tomlinson. Published in Weale's 'Rudimentary Series.' London, 1850.

4. *Practical Remarks on the Warming, Ventilation, and Humidity of Rooms.* By Francis Lloyd. London, 1854.

5. *Some Account of Domestic Architecture in England from the Conquest to the end of the Thirteenth Century.* By T. Hudson Turner. Oxford, 1851. *And from the time of Edward I. to Richard II.* By the Editor of the 'Glossary of Architecture.' Oxford, 1853.

It is mid-winter: cold, dark, and dreary without; warm and cheerful within. Seated by the side of the family hearth, the lover of home pleasures may now for the first time enjoy the luxury of an open fire without its usually-attendant inconveniences. This result, which is due to the inventions of a scientific physician of our own day, forms a successful supplement to the labours of ingenious men of past ages, who have devoted their talents to improving the domestic comfort of their fellow-creatures, and thus diminishing or cutting off some of the numerous sources of disease. And if the use of fire may in itself be considered as the distinguishing physical characteristic of man (the most savage nations being adepts in the use of the 'fire-stick,' while animals, until domesticated, have a dread of flame), then must we also consider in the light of benefactors all those who enhance the value of the gift, by bringing it more completely under our dominion, whether for the requirements of the arts, science, and commerce, or for the not less needful purposes of home comfort and healthful enjoyment.

> 'Now stir the fire, and close the shutters fast,
> Let fall the curtains, wheel the sofa round,
> And while the bubbling and loud hissing urn
> Throws up a steamy column, and the cups
> That cheer but not inebriate, wait on each,
> So let us welcome peaceful evening in.'

This passage, from Cowper's 'Task,'* owes its popularity to the delightful associations it calls up. Convert 'the fire' into a dull, dry, irradiant stove, and the charm is dissolved. We may heat our public buildings and churches with steam or with hot water, but we must leave to the German or the Russ the pleasurable ideas connected with such sullen warmth in living apartments. The enjoyment of the open fire is even too deeply seated among Englishmen to be greatly disturbed by its ordinary defects. Every house has its annual chapter of accidents or annoyances: fuel is wasted, chimneys smoke, dust is increased, soot accumulates, perhaps takes fire, property is destroyed, children are burnt to death; while it cannot be denied that rooms are unequally warmed and badly ventilated, faces are scorched while feet are freezing, and, except for those in the immediate vicinity of the hearth, there is little warmth or comfort in many a room which bears the outward semblance of both in its cheerful open fire.

In treating of the history and philosophy of 'the open fire' it is impossible to pass by altogether the material which feeds it. It would be an interesting inquiry to trace the influence which the scarcity or abundance of fuel has exercised on the moral and industrial condition of the various countries of the earth; for it cannot be doubted that the ease or difficulty with which fuel is procurable has a considerable effect in promoting or depreciating the health and personal comforts of nations, and that these, by a reflex action, contribute greatly to the formation of national character. Where fuel is scarce houses are small, and their occupants crowded together; the external air is as much as possible excluded; the body becomes dwarfed, the intellect dull. The diminutive Laplander spends his long and dreary winter in a hut, heated by a smoky lamp of putrid oil —an arrangement which afflicts the whole nation with blear-eyes. The hut of the Greenlander is larger and better contrived, but is often peopled by half a dozen families till the air becomes so contaminated that, as a traveller remarks, 'the smell strikes one not accustomed to it to the very heart.' The lace-makers of Normandy work by night in the sheds where cows are tethered for the sake of the steaming warmth afforded by the animals. The lace-makers of Nottingham, some years ago, were accustomed to assemble in winter, to the number of fifteen or twenty, in a small room, braving the effects of a poisonous atmosphere to enjoy the solace of the heat engendered by their breath. Such a scarcity of fuel as these usages imply is always accompanied by

* One of the most beautiful gift-books which has appeared this season—one of the most beautiful, indeed, that has ever appeared in any season—is a new edition of 'The Task' of Cowper, richly illustrated by Birkett Forster.



by general wretchedness, personal and domestic. The people lodge in miserable hovels, wear ragged clothes, and take to stimulating drinks to supply the place of well-cooked food. Where coal, on the contrary, is abundant, the habitations are mostly decent, and the people are well provided with necessaries. One obvious reason of this contrast is, that when fuel is costly the working-hours of the poor are curtailed in severe weather by their inability to keep up a fire. Men who labour at their own homes, and women who earn money at domestic employments, cannot continue their tasks when benumbed with cold; and are under the necessity of going earlier to bed, and remaining in it longer than they would otherwise do.

Nor need our examples be limited to the abodes of poverty. In the noblest mansions of the cities of Persia a contrivance is adopted scarcely superior to that of the smoky lamp of the Greenlander. A large jar called a *kourey*, sunk in the earthen floor in the middle of the room, is filled with wood, dung, or other combustible, and when the fuel is sufficiently charred, a square wooden frame is put over the vessel and covered with a thick wadded quilt, under which the members of the family sit or recline, with the quilt drawn up to their chins. The warm, deleterious vapour produces headache, and in some cases suffocation—in all, enervation of body and mind.

Scarcity of fuel has not been without its effects in forming the manners of the polished Parisians, and has transferred to the theatre and the café those attractions which in the British Islands belong essentially to the domestic hearth. While vast forests existed in abundance they were our grand magazines for feeding the fire, and even where wood was scarce coal was neglected, under an idea that its fumes corrupted the air, and exerted an injurious effect upon health. So late as the year 1349, in the religious house at Whalley, in the neighbourhood of the coal-fields, peat and wood were alone employed. The increasing price of wood led to the demand for a cheaper material by smiths, brewers, and others, whose trades required large quantities of fuel, and towards the close of the thirteenth century coal was imported into the metropolis from Newcastle for the use of furnaces. In 1306, however, the King was petitioned to stop the consumption of the noxious article in the city; and accordingly a royal proclamation was issued prohibiting the burning of coal. The royal command being disregarded, a commission was appointed for the purpose of ascertaining what persons used sea-coal (*i. e.*, coal brought by way of the sea to London), with power to punish by fine for the first offence, and afterwards by the demolition of the offending furnaces. As the consumers of coal had by this time learnt its value, and persisted in employing it, a

law was passed making it a capital offence to burn it within the precincts of the city. In the reign of Edward I. a man was actually executed for the commission of the crime. We may trace the prejudice to the close of the sixteenth century. In the description of England inserted in 'Holinshed's Chronicles' (A.D. 1584), it is stated that sea-coal 'beginneth to grow from the forge into the kitchen and hall of most towns that lie about the coast;' and that if the waste of wood continues, the discredited mineral 'will be good merchandise even in the city of London.' Ladies had an idea that their complexions would be injured by entering a room where it was burning; and persons would not even partake of meat which had been roasted at a coal fire. At the commencement of the seventeenth century our ancestors abandoned these fanciful ideas: * they were, however, adopted by our neighbours on the opposite side of the Channel, and were retained until our own time, even if they can now be said to be entirely given up. It is not more, we believe, than a quarter of a century ago that an ambassador at Paris issued cards for a large party, and found to his dismay that only gentlemen attended, the ladies having absented themselves on learning that his lordship warmed his house by means of English coal.

The aversion of our ancestors to coal before the introduction of the chimney certainly admits of excuse. In the time of the Anglo-Saxons

> 'the fire was kindled in the centre of the hall; the smoke made its way out through an opening in the roof immediately above the hearth, or by the door, windows, or eaves of the thatch. The lord and his "hearthmen" —a significant appellation given to the most familiar retainers—sat by the same fire at which their repast was cooked, and at night retired to share the same dormitory which served also for a council-chamber.' —*Turner: Introd.*, pp. viii. ix.

The strongholds which were erected about the period of the Conquest consisted of several stories, and their roofs were used as a terrace for defence, thereby rendering the central hearth and opening impracticable; but as it was necessary to provide some exit for the smoke, the fireplace was made in the wall, and terminated in a loop-hole on the outside: this was an important step towards the construction of the chimney.

* In the year 1853 there were shipped at the several ports of Great Britain and Ireland, coastways, to the other parts of the United Kingdom 8,835,573 tons of coal, 40,412 tons of *cinders*, (as coke is called in Parliamentary language,) and 195,269 tons of culm or anthracite, making a total of 9,070,984 tons. In the same year were exported to foreign parts, and British settlements abroad, 3,758,123 tons of coal, of the declared value of 1,507,950*l.*, and 176,939 tons of cinders, of the declared value of 96,641*l.* In the same year the quantity of coals brought into the port of London alone, amounted to 4,026,985 tons, of which 3,373,256 tons were brought coastways, and 653,729 tons by inland navigation and land carriage.

Coningsburgh



Coningsburgh and Rochester castles furnish examples of this contrivance, which prevailed, without much variation, from the twelfth to the fifteenth century. Until the latter period the chimney, properly so called, appears to have been little known in England, or indeed in many other parts of Europe. The ancient Romans seem not to have been acquainted with it; and there is no trace of it in Italian houses up to the fourteenth century, by the middle of which it had become common at Venice; for an inscription over the gate of the school of Santa Maria della Carita states that in the year 1347 a number of chimneys were thrown down by an earthquake. We learn also that in 1368 a prince of Padua, on making a journey to Rome, took with him masons to make a chimney at the inn at which he put up, 'because in the city of Rome they did not then use chimneys; and all lighted the fire in the middle of the house on the floor.' * But, as Mr. Turner remarks, in seeking to ascertain the antiquity which should be assigned to chimneys, facts are often at variance with the statements of respectable writers. Existing remains prove that perpendicular flues were constructed in England in the twelfth century; yet Leland, writing in the sixteenth century, speaks with surprise of a chimney in Bolton Castle, which he says was 'finiched or Kynge Richard the 2 dyed. One thynge I much notyd in the hawle of Bolton, how chimeneys were conveyed by tunnells made on the syds of the walls betwyxt the lights in the hawle, and by this means, and by no covers, is the smoke of the harthe in the hawle wonder strangely conveyed.' We can only suppose, with Mr. Turner, that the principle of the modern chimney was understood long before the construction itself became general. The cost of remodelling the house would, in very many cases, prevent the improvement. In drawings of the time of Henry III., chimneys of a cylindrical form are represented rising considerably higher than the roof, and orders to raise the chimneys of the king's houses are frequent in this reign. Nevertheless, it was still the general custom, even in the fourteenth century, to retain the hearth in the middle of the room. When the wood was fairly ignited the smoke would not be great, and the central position of the fire was favourable to the radiation of heat. This method of warming the hall was continued long after fireplaces with chimneys had been erected in the smaller apartments. By the reign of Elizabeth the advantages of the new system were so well appreciated, that ladies in their visits to their friends, if they could not be accommodated with rooms with chimneys, were frequently sent out to other houses, where they could enjoy the luxury.

* *Muratori.* 'Antiq. Italicæ,' quoted by Turner.

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We may gather, then, that the chimney has been in use for at least five centuries; and throughout that long period it seems to have been constantly employed with a very imperfect appreciation of the physical laws on which its action depends. Probably even at the present day, few of those who erect chimneys would be able to explain the conditions of their successful action; while the learned chimney-doctor often fails in his diagnosis, and rashly prescribes for a malady from which the patient may be free, while neglecting that which would be evident to the eye of the man of science.

It is often supposed either that smoke ascends the chimney because it is lighter than the surrounding air, or that some mysterious power exists in the chimney by which the smoke is drawn up and discharged. That smoke is not lighter than air, the following experiment, devised by Dr. Franklin, will show. If a pipe of tobacco be lighted, the stem plunged to the bottom of a decanter half full of cold water, and the bowl covered with a piece of linen so that it may be blown through without burning the lips, the smoke will descend the stem of the pipe and bubble up through the liquid, and thus becoming cooled it will not rise out of the decanter, but will spread over the surface of the water. This shows that smoke is in reality heavier than air. But the murky cloud, which consists of carbon, hydrogen, carbonic acid, carbonic oxide, vapour of water, and other products, is mixed with a large portion of the air which enters the fire. It is this invisible column of heated air that by its expansive force carries with it the visible and less heated smoke, until it emerges from the top of the chimney, where it encounters the cold of the external atmosphere, loses its ascensive power, and unless some kindly breeze convey it speedily away, hangs like a cloud over the crowded city, or falls in minute particles of carbon, begriming everything below.

That there is a draught to a chimney, is simply due, therefore, to the rarefying influence of heat. The colder the particles of air, the closer they lie together, while they recede from each other in proportion to their heat. It follows that a given volume of cold air weighs considerably more than a similar bulk of heated air; and such is the mobility of the aërial particles, that a slight rise in temperature starts them on their upward journey, and, as they rapidly ascend, the colder particles close in and occupy their place. In the instance of the fire, the first particles of air which come in contact with the burning fuel pass up the chimney, and distribute their heat to other particles in their course, at the same time that fresh air keeps flowing towards the grate to fill up the vacuum. The draught in a chimney when



when there is no fire is small. Hence it often happens that a room feels colder with a recently lighted fire than before: the stagnant and comparatively warm air of the apartment has fled up the shaft, and the raw outer air rushes in to supply its place before the newly ignited fuel has had much influence.

The action of heat in establishing a current in a chimney may be further illustrated thus:—Let a glass tube, 1 inch in diameter, 12 inches long, and open at both ends, be attached to some fixed support, in an upright position, so that it need not afterwards come in contact with the warmth of the hand. Fasten to the end of a quill five or six inches of floss silk, in order to detect by the stirrings of the loose filaments when held at the upper or lower mouth of the tube, the motion of the air passing through it. If the tube and the air of the room be of the same temperature, no current will be observed; but if the tube be slightly warmed, a current will be found to enter below and to be discharged at the top, because the tube communicates its warmth to the air within it, rarefies it, and makes it lighter than the external air, which presses in from below, forces it upwards, and becomes warm and rarefied in its turn. If a hot poker be fixed a little way below the mouth of the tube, the entering air, heated by the metal, will set in motion a brisker current, which will be maintained with gradually decreasing force, and will only cease when the metal and the tube have sunk down to the temperature of the surrounding air. In this experiment the form of the tube is of very little consequence to the result: it may be crooked or straight, tapering or of equal bore, pyramidal or square; and so with the chimney, in spite of the assurance of the chimney doctor to the contrary. It is true that it may be so badly constructed as to offer considerable resistance to the ascending current; for whatever long interferes with the vertical direction of the shaft will delay and consequently cool the hot air, though a bend is beneficial in the upper part by preventing the sudden descent of wind and rain. In all calculations of the velocity of the draught, an allowance is made for the retardation of the air by friction, which, in straight tubes, is directly as the length of the tube and the square of the velocity, and inversely as the diameter.

Dismissing, therefore, the form of the chimney as comparatively non-essential, we come now to speak of its height, which is of great importance, since an increased height admits of an increased quantity of heated air, and a larger amount of cold air from the room must be constantly pouring in to supply its place. In other words, there will be a stronger draught. So also the fiercer the fire the more the temperature of the aërial column is raised,

raised, its elastic force augmented, and the greater is the demand made on the air of the room. In fact, the ascensive force of the current passing up the chimney is the difference between the weight of the column of hot air in the chimney, and that of a column of the surrounding atmosphere of equal height.

The quantity of air contained in a room 30 feet long, 28 feet wide, and 19 feet high, equals 15,960 cubic feet ($30 \times 28 \times 19 = 15{,}960$), and as 13 cubic feet of air weigh nearly one pound, the total weight of air in such a room is about 1220 pounds, or rather more than half a ton. Four-fifths of this air consist of nitrogen, which supports neither animal life nor combustion; one-fifth only consists of oxygen or vital air, without which no animal could live, no fire could burn. The very processes, however, of living and burning convert this oxygen into carbonic acid gas, an enemy both to life and to combustion. We occupy such a room for many hours together, and exert our ingenuity in excluding cold air: windows and doors are *listed*, sand-bags are placed over the junction of the sash-frames, a thick mat is laid at the bottom of the door, and even the keyhole is closed by a little falling shutter. Under these circumstances the inmates suffer from headache and nervous sensations, but the most obvious source of annoyance to them is that the fire will not burn or that the chimney smokes. The freer the room is from draughts the greater is the evil, for air is the *pabulum vitæ* to the fire as well as to ourselves, and if it is not admitted to have a passage through the room, it comes down the chimney, and brings the smoke with it. In truth we do wrong to leave the supply to chance crevices. Nearly 150 years ago Gauger devised a remedy for the inconvenience, by making a channel under the floor, one end passing through the outer wall of the house and the other opening in the centre of the hearth. Dr. Franklin's method of ascertaining in a rough way how much air is required to be admitted per minute, was to set the door ajar until the fire burnt properly, and gradually close it again until smoke began to appear; he then opened it a little wider, and if the width of the crevice was half an inch in a door 8 feet high, the room would need an aperture equal to 48 square inches, or a hole 6 inches by 8. Six inches square would probably be sufficient for the wants of most chimneys. But where to form this aperture is a difficult question. If made in the door, it admits a cold current to the back and feet of persons sitting near the fire, and also interferes with the privacy of the room: if made in the window, it brings down a cataract of untempered air upon the head. A plan which has come of late into pretty general use, is to have the opening nearly on a level with the top of the



the room at the corner furthest from the chimney-place, and to shield it on the inside with a board sloping upwards. This directs the atmospheric current which enters from without against the ceiling, along which it streams, and coming in contact with the hot ascending air of the apartment, mingles therewith and partakes of its warmth. Dr. Franklin and Count Rumford advocate a similar contrivance, which within the last few years has been made the subject of a patent; but we would venture, with much deference, to differ from these high authorities on the following grounds. It has been wisely ordained in nature that the air issuing from our lungs (which is incapable of supporting respiration or combustion, and acts like a poison if breathed a second time) shall have a temperature of 98°, sufficient to impart to it that elastic ascensional force which would convey it away, did the arrangements of our rooms permit it to be carried off. Dr. Arnott's chimney valve does provide for its escape; but under ordinary circumstances the products of respiration and combustion rise upwards till they are stopped by the ceiling, when they again descend and pass out by the crack at the top of the door, or mingle with the air which rushes towards the fireplace. Thus by a clumsy contrivance, or rather no contrivance, for it was not designed by the house-builder, the foul air is partially got rid of. Now if a sheet of cold air be allowed to spread over the ceiling, it condenses the impure stratum, and causes it to descend with increased rapidity to be breathed over again on its way to the chimney. The effect of such an arrangement is also greatly to lower the temperature of the apartment. We believe, therefore, that the proper plan is to admit the air by a channel from without opening in the hearth in front of the fire; or by a number of small apertures placed behind the skirting, which should be set a little forward for the purpose, each hole being covered with perforated zinc or wire-gauze. By either of these methods a broad sheet of air may be introduced at a low level without occasioning draughts, while due provision should be made at the top of the room for the passage of the vitiated air.

Previous to the time of Count Rumford, it was a common fault to make the mouths of chimneys, and the chimneys themselves, of too large dimensions. The practice appears to have been derived from the model of the fireplace in the old baronial hall or kitchen. In the one case the logs piled up on the hearth, and raised only a few inches above it by the massive andirons, sent, regardless of waste of fuel, more copious floods of heat up the chimney than were radiated into the room, but allowed a large party to assemble before the blaze. In the other case so vast was the cavity, that seats were made in the jambs, and it was almost literally

literally possible to sit *round* the fire. The plan is still preserved in many of the ancient farm-houses and cottages which remain in the country. As the mantel was raised above the ordinary stature of a man, the apartment was at least well ventilated; but as only a small portion of the air which entered the chimney passed through the fire, it was not always sufficient to maintain an ascending current, and hence these old fireplaces were liable to smoke.

One of the earliest improvers of the system was Louis Savot, who was born about 1579, and became a licentiate in the faculty of medicine at Paris, in 1610. He was early impressed with the maxim of Vitruvius, that it is indispensable in an architect to have some acquaintance with medicine, and he saw no reason why a medical man should not have an acquaintance with architecture. Accordingly he studied architecture in a sanitary point of view, and published in the year 1624 a work entitled '*L'Architecture Françoise des Bastimens particuliers*,' which seems to have met with much success during the life of the author, and was twice reprinted after his death.

There are many sound principles and ingenious notions to be found in Savot's treatise, which we cannot notice here. They are chiefly applicable to wood-fires, but they have suggested, and may still suggest, hints to persons engaged in fireside improvements, a remark which applies to most of the old works which we have consulted on this subject. We must dwell longer upon the very meritorious fireplace of Gauger, which has been erroneously ascribed to the Cardinal Polignac. A full description of it is given in a work which the inventor published in 1713, entitled '*La Mécanique du Feu*,' and from a translation which appeared in English in 1716, we quote his complacent commentary upon his contrivance:—

'A plate of iron or copper, bowed or bended after such a manner as is not at all disagreeable to the sight; a void behind, divided by certain small iron bands or partition plates, forming several spaces that have a communication one with another; a little vent-hole in the middle of the hearth; a register-plate in the upper part of the funnel; and for some shafts a capital on the top, make up the whole construction and workmanship of our modern chimney. How can there be anything more simple, or plain, or easy to execute? To be able to kindle a fire speedily and make it, if you please, flame continually, whatever wood is burning, without the use of bellows; to give heat to a spacious room, and even to another adjoining, with a little fire; to warm one's self at the same time on all sides, be the weather ever so cold, without scorching; to breathe a pure air always fresh, and to such a degree of warmth as is thought fit; to be never annoyed with smoke in one's apartment, nor



nor have any moisture therein; to quench by one's self in an instant any fire that may catch in the funnel of the chimney; all these are but a few of the effects and properties of these wonderful machines, notwithstanding their apparent simplicity. Since I used this sort of chimney, I have not been troubled one moment with smoke in a lodging which it rendered untenable as soon as a fire was lighted; I have always inhaled, even during the sharpest seasons, a fresh air like that of the spring. In 1709, water that froze hard everywhere else very near the hearth, did not congeal at night in my chamber, though the fire was put out before midnight; and all that was brought thither in the day soon thawed; neither did I ever perceive the least moisture in winter, nor even during thaws.'

This flattering account of the results of his invention would lead one at first sight to suppose that Gauger had made a sudden bound to perfection, and that nothing further remained to be effected in the improvement of fireplaces. Yet his mention, twice over, of the absence of moisture in his rooms, leads to the suspicion that the unpleasant sensations caused by breathing burnt air, or air which has been in contact with heated metal, was, notwithstanding what he says of its 'freshness,' a defect in his system.

Gauger, nevertheless, was a master of his art. He rightly states that a fire communicates heat to a room by *radiation*, *reflection*, and *conduction*. Radiant heat is reflected according to the same law as light, namely, the angle of incidence is equal to the angle of reflection, and hence it follows that in a fireplace with straight jambs, very few of the rays are reflected into the room. Thus F *f*, Fig. 1, being a fire in an ordinary chimney, of which the jambs A B, *b a* are parallel, the ray of heat *f* G will be reflected to M; the ray *f* H will be reflected back upon itself at *f*; the ray *f* I to N; and the ray *f* L to P. This last ray is the only one which can be reflected into the apartment, the others being reflected to the back, or up the chimney, or among the fuel, and contributing in no way to the useful heating effect of the fire. Where the jambs are of plaster the case is still worse, for the rays falling on a dull surface, are absorbed. Having shown how mistaken was the ordinary construction, Gauger proceeds to describe the form of the jambs which would reflect the greatest amount of heat:—

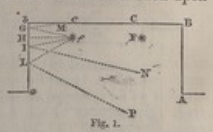

Fig. 1.

'Geometricians are sensible that all radiuses which set out from the focus of a parabola and fall upon its sides, are reflected back parallel to its axis. If, therefore, you take on the bottom of a chimney-hearth, A B,

A B, *b a*, Fig. 2, a length *c* C, equal to that of the wood designed to be burnt, for example, of half a log or billet, which at Paris is 22 inches, from the points C *c*, let fall the perpendicular C D, *c d*, which may be the axis of two semiparabolas whereof C *c* are the vertices, and A *a* (the distance between which is the breadth of the chimney) each of them one of their points; that done you are to line with iron or copper plates the two parabolical sides A C, *a c*, of the chimney, and make the lower part of the concave parallel to the horizon, and as large as it can be, only leaving ten or twelve inches for the aperture of the chimney funnel. By this arrangement as much of the heat as can be, will be reflected, for all the rays of heat from the focus F *f* of each semi-parabola, as *f g*, *f h*, *f i*, *f l*, &c. will be reflected back parallel to the axis *c d*, in *m*, *n*, *o*, *p*, and consequently pass into the room. So also, all those rays as E H, which are not reflected back parallel to the axis, will nevertheless be reflected into the chamber, or nearly so. Besides this, the jambs being so much nearer the fire than is usual, will soon become heated, and reflect a large number of rays.'

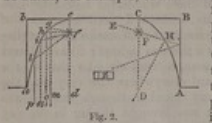

Fig. 2.

Draughts towards the fire were avoided by introducing the outer air by a *soufflet*, or blower, the opening of which was in the centre of the hearth at Z. This was furnished with a trap-door, or valve, opening upwards, which could be set at any desired angle, or closed altogether.

This great improvement in the form of the jambs of the fire-place formed but a small part of Gauger's invention. The back, the jambs, the hearth, and the mantel were all made hollow, and were formed by means of perpendicular or horizontal divisions into spaces or *caliducts*, which were supplied with air from without, not by the same channel which supplied the fire, but by a distinct opening shown at *a* in Fig. 3. This figure represents the horizontal arrangement of caliducts, and makes it clear how the air, passing in the direction of the arrows beneath the hearth *e*, and traversing the caliducts at the back of the grate, must have become thoroughly warmed before it passed from the last caliduct *d*, just beneath the smoke-flue *m*, and made its way into the apartment at *x*. The supply of hot air to the apartment was regulated at this point by a valve in the air-channel, formed on the principle of Papin's four-way cock, so that

Fig. 3.



that warm air could be obtained in greater or less quantity, or it could be shut off altogether and cold air admitted in its stead, or the whole supply of cold air might be excluded both from the caliducts and from the room. Gauger's treatise contains descriptions of a number of complicated fireplaces on this principle, and shows how two rooms may be warmed by one fire, by carrying a pipe from the caliducts through the wall into an adjoining room, or through the ceiling into a room above. For very large public rooms two of these fireplaces may be fixed back to back in the centre of the apartment (in which case there must of course be a descending flue), with one series of caliducts for both.

It must be evident to all persons that Gauger's contrivance is very superior to the majority of fireplaces in use at the present day. The external air is conveyed in sufficient quantity by the air tube, and passing through the caliducts, is raised to a genial temperature; it is thus discharged into the room, and communicates an agreeable warmth to every part, so that it is not necessary for a person in cold weather to warm himself by crouching over the fire, and scorching his face, while his back perhaps is exposed to the chilling influence of chink-winds. As the warm air is constantly streaming in, an equal quantity must at the same time be constantly escaping into other parts of the house, or up the chimney, which secures ventilation as well as warmth. The cutting off of draughts is of greater importance than is generally supposed. Their danger has passed into a proverb in more than one language. 'Shun a current of air from a narrow passage as you would the point of an arrow,' say the Chinese; and the Portuguese have an admonitory couplet to this effect:—

> 'If cold wind reach you through a hole,
> Go make your will, and mind your soul.'

The Gauger fireplace was adapted to the burning of wood fuel. Dr. Desaguliers modified it so as to allow of coal being burnt, and it met with some success in the metropolis. The scientific opponents, however, of the learned doctor selected this useful labour as a vulnerable point, and attacked him on the ground that 'it burnt the air, and that burnt air was fatal to animal life.' In vain did he remonstrate, and give an account of experiments, which, at the present day, would rather tell against his cause than assist it. He passed, for example, atmospheric air over red-hot iron, and collecting it in a receiver, encaged a bird in it which continued for some time to live cheerfully and happily; but on making a similar experiment with air that had passed over red-hot brass, the bird was immediately killed; 'for we know,' he

he says, 'that brass has in it something stinking and unwholesome when cold, whereas iron is perfectly wholesome.'

The fireplaces having failed, the progress of domestic comfort was retarded by at least a century. Many years afterwards, in his excellent work, entitled 'A Course of Experimental Philosophy,' Desaguliers relates the history of this contrivance, and remarks mournfully:—'As I took so much pains and care, and was at some expense to make this management of air useful, I cannot help complaining of those who endeavoured to defeat me in it.' He was, in fact, altogether an ill-fated philosopher. His ventilating fan was not appreciated by his contemporaries, though in our own day it has rendered such excellent service in the cause of sanitary improvement. He ventilated the House of Commons in 1723, on correct principles, by erecting fireplaces in closets over the ceiling of the house in the upper portion of the building, and leading into their chimney shafts the vitiated air which was drawn off by apertures in the ceiling. But here again he was doomed to be defeated by ignorance and selfishness, for Mrs. Smith, the housekeeper, thinking it a grievance to be disturbed in the possession of *her rooms*, neglected to light the fires at the proper time, and the honourable members of the day pronounced the plan a failure.

In 1745 Dr. Franklin published a pamphlet, in which he described a fireplace suggested by that of Gauger, under the name of the Pennsylvanian stove, which, being contrived with a decending flue, exposed a considerable extent of metallic surface in the room, to be heated by the flame and smoke before they reached the chimney. It was originally adapted for wood fuel, but in 1753 was modified by Mr. Durno for the combustion of coals. The fuel-box was 15 inches wide, 5½ inches deep from the grate to the top bar, and 5½ inches from front to back. It is stated that by means of this fireplace a room 14 feet square was maintained at a temperature of between 60 and 64 degrees during 13 hours, with the combustion of only one peck of coals, and this at a time when the external temperature was 28 degrees. Like the predecessors to which it owed its origin, it does not appear to have obtained favour in England, any more than other contrivances on the same principle, which, from time to time, were patented, and then allowed to go out of use. Indeed architects erect houses and construct fireplaces in a way which renders it extremely expensive, as well as troublesome, to adopt improvements. When the building is finished, and the grates on the common construction are all *in situ*, it requires more than ordinary means and courage to tear them out, and set in their places scientific contrivances of which no one perhaps can give any practical account.



account. Even if an ironmonger were supplied with working drawings of a fireplace with caliducts, he would have to send to Wolverhampton, or some other 'casting' district; the manufacturers would be well nigh as much puzzled as himself, and if they succeeded at last in producing in iron the mysterious apparatus, the cost would be excessive. Unless builders and ironmongers are parties to these improvements, improvements are all but hopeless. It would seem to be a very simple operation to convey from the outer wall of a house an air tube, to open in a soufflet in the hearth, but if any one attempts this simple operation, he will probably find that the tube of 4 inches square cannot be placed under the floor without cutting the joists to such an extent as to render them insecure; that the driving the aperture through the side-wall of the chimney, which projects into the room, will be expensive, if not unsafe, that the grate must be taken out, the hearthstone taken up, and domestic comfort be disturbed for an indefinite length of time by bricklayers, masons, and ironmongers. Even those who write most learnedly on the subject are fellow-sufferers with those who hope to get information from the learning. We have been present in a room, lighted with gas, and warmed by a common fire, where a number of distinguished chemists, seated at a table, were arranging in council the affairs of a philosophical society. Any one of these gentlemen could have given a most satisfactory lecture on the folly and danger of breathing impure air; and yet from the force of habit, and from a feeling perhaps that the remedy was out of their own hands, they submitted to hold their consultations in an atmosphere unfit for animal respiration.

The most successful of all the modern attempts to improve grates and economise fuel was that of Count Rumford, at the close of the last century. His labours were more generally received than those of his predecessors, and the Rumford stove soon became and still continues a favourite. When he began his reform of domestic fireplaces, the common construction (in spite of all that had been advanced by Gauger and others) was to make the back of the fireplace as wide as the opening in front, with the sides perpendicular to it, and parallel to each other. The space above the fire was also of large dimensions, and there was a metal plate or cover in use, which sloped upwards towards the *back* of the chimney, and tended to draw up the warm air instead of reflecting the heat into the apartment.

In order to increase the warming effect of the fire, Count Rumford brought the grate forward, that the rays of heat which had formerly struck against its perpendicular jambs might be available in the room. It thus became necessary to build up a new back

back to the grate, which now stood detached from the original chimney-back, and this gave him an opportunity of effecting his second great improvement, which was to diminish the throat of the chimney to the smallest possible size that would suffice for the transmission of the smoke. An abstract of the Count's description will explain the arrangement:—In a room of medium size, suppose the thickness of the wall of the chimney in front, as measured from the front of the mantel to the breast, be 9 inches; set off 4 inches for the width of the throat, and supposing the back of the chimney to be built upright, as it should be, this will give 13 inches for the depth of the fireplace as measured upon the hearth. In such a case 13 inches will be a good size for the width of the back, and three times 13 inches, or 39 inches for the width of the opening of the fireplace in front, so that the angle made by the back of the fireplace and the sides or covings equal 135°. In shaping the throat of the chimney, the ends of the new walls are to form a flat horizontal surface, which renders it more difficult for wind to force its way through the narrow passage than if the sides were sloped outwards, or made to swell out at the upper extremity of the throat into a trumpet-shape, till it increased by degrees to the size of the canal of the chimney. Circular or curved forms for the covings are objected to as being productive of eddies in the current of air which flows towards the fire. That portion of the current which passes under the mantel should be made gradually to bend its course upwards, so as to unite with the smoke, instead of crossing upon and embarrassing it in its ascent, and the desired end is attained by rounding off the breast of the chimney, which before his time was frequently left flat and full of holes and corners.

To the other beneficial changes was added the diminution of the size of the grate by filling up the back and sides with pieces of firestone, till the width of the cavity was reduced to six or eight inches. Under the old construction the Count calculated that 14-15ths of the heat escaped up the chimney and was lost.* Any attempt to maintain a small fire was ineffectual, on account of the great mass of metal of the grate, and the air rushing into it, cooling down the fire below the point necessary for combustion, as a live coal which falls upon the hearth soon ceases to be red-hot from the cooling effect of the surrounding atmosphere and the cold material on which it falls.

* Dr. Arnott estimates the loss at seven-eighths, of which one half is lost in the smoke as it issues from the burning mass; two-eighths are carried off by the current of the warmed air of the room, which is constantly entering the chimney between the fire and the mantelpiece, and mixing with the smoke; and the rest is lost from about an eighth of the combustibles passing away, as soot or unburned fuel.

Such



Such is a brief statement of Count Rumford's important additions to domestic comfort, derived from his verbose Essay, which possesses the charm which is communicated by earnestness of purpose. He is constantly returning to points which have been already demonstrated; and, lest there should be any mistake, after giving, at the end of his Essay, 'Directions for laying out the work,' he has a second supplement consisting of wood-engravings with separate descriptions. He also names many of the nobility and gentry who have adopted his plans with success, and gives references to the workpeople who executed them. With the honest pride of an inventor, he refers to at least five hundred smoky chimneys which he has conquered, and says, 'I have never been obliged, except in one single instance, to have recourse to any other method of cure than merely reducing the fireplace and the throat of the chimney to a proper form and just dimensions.' He remarks that the alterations involve very little expense, requiring only a few bricks and some mortar, or a few pieces of firestone; that they are adapted to any kind of grate or stove, and that they have effected a saving of fuel equal to one-half, and frequently two-thirds, of the quantity previously consumed. He requests the public, tradesmen, and manufacturers to observe that as he had no intention of patenting any inventions of his which might be of public utility, all persons were at full liberty to imitate them, and vend them for their own emolument; 'and those who wish for further information will receive *gratis* the information they require by applying to the author, who will take pleasure in giving them every assistance in his power.'

The opening for the passage of the smoke in the plan of Count Rumford, was, as we have seen, only four inches wide, and he had a clumsy contrivance for removing a portion of the masonry to permit the chimney to be swept. This defect was remedied about the year 1806 by the introduction of stoves with a plate of iron, not sloping upwards towards the *back* of the chimney, as had previously been the case, but inclining upwards in the contrary direction towards the mantel, and being supplied with a trap-door for the smoke. These plates or registers have continued in use ever since; they are convenient and easy of removal, but are less favourable to economy of fuel than masonry, because of the greater conductibility of metal.

The register is really a very old contrivance, and appears in some cases to have been synonymous with the damper. In the furnaces of the alchemists, openings left for the supply of air, and which could be contracted or entirely closed by means of clay, were called registers. Thus we find in Ben Jonson:—



Look

Look well to the register,
And let your heat still lessen by degrees.

The first mention that we have met with of the register-plate occurs in Savot, who, on the authority of Scammozzi, says that it was customary in England when a brazier full of fuel was well lighted, and had ceased to smoke, to shut the iron door, and confine the heat to the room.

Dr. Franklin, writing in 1785, puts in a claim to the invention of the modern 'registers,' or 'sliding plates, which have since been brought into use under various names, with some immaterial changes,' but which he states to have been contrived by himself in 1758, and described in a letter to J. Bowdoin. In this letter he speaks of the method as designed for keeping rooms warmer in cold weather, and with less fire, than usual.

'The opening of the chimney is contracted by brickwork, faced with marble slabs to about two feet between the jambs, and the breast is brought down to within about three feet of the hearth; an iron frame is placed just under the breast, and extending quite to the back of the chimney, so that a plate of the same metal may slide horizontally backwards and forwards in the grooves on each side of the frame. This plate is just so large as to fill the whole space, and shut the chimney entirely when thrust quite in, which is convenient when there is no fire. Drawing it out so as to leave a space between its further edge and the back, of about two inches, this space is sufficient for the smoke to pass, and so large a part of the funnel being stopped by the rest of the plate, the passage of warm air out of the room up the chimney is obstructed and retarded, and by that means much cold air is prevented from coming in through crevices to supply its place.'—*Franklin's Works by Sparks*, vi. 534.

Dr. Franklin notices as an instance of 'the tractability of smoke,' a fireplace which he saw at an inn in Staffordshire.

'The opening of the chimney is bricked up even with the fore-edge of its jambs, leaving open only a passage over the grate of the same width, and perhaps eight inches high. The grate, with the coals it contains, is wholly without the wall that shuts up the chimney; yet the smoke bends and enters the passage above it, the draught being strong, because no air can enter that is not obliged to pass near or through the fire, so that all that the funnel is filled with is much heated, and of course much rarefied.'—*Franklin's Works*, vi. 531.

We have seen many such fire-places put up as a cure for smoky chimneys, but they burn with a roaring draught that causes a great consumption of coals.

Admirable in many respects as were the remedies we have been describing, they did not, we fear, touch certain cases of smoky chimneys which torment the housekeeper to the present day.



day. For example, the canal or funnel of the chimney may be too high, compared with the size of the fire, when the hot air will cool down before it reaches the top and loses all its ascensive force. In other words, the column of air within the chimney being nearly of the same weight as an equal column on the outside of the chimney, there will be little or no motion up the shaft, and the smoke will fall back into the room. It more frequently happens, however, that the funnel is too short, as with attics, when, if the shaft cannot be lengthened, the remedy is to contract the opening of the fireplace, and thus compel all the air which enters to pass through or very near the fire. The chimney of an upper is sometimes turned into the flue of a lower room, which is one of the most effectual methods for producing smoky chimneys that could possibly be devised. If a fire is kindled in the upper room when there is none below, the smoke has to encounter the reservoir of cold air in the main shaft. Its ascensive force being thus destroyed, not only may the upper room be filled with smoke, but it is also apt to creep down the principal flue, and invade the apartment beneath. On the contrary, if the lower fire only be kindled, the cold air from above rushing in at the upper part of the flue will cool it down at that point, and, as in the former case, may cause the smoke to descend into both the rooms. The remedy for these inconveniences is either the objectionable one of closing the upper fireplace with a well-fitting fire-board, or the inconvenient one of keeping up a fire in both apartments, when the joint effect will increase the force of the draught in the main shaft.

The principal remedy for smoky chimneys being to keep up an ample supply of air, and no special provision being made by the housebuilder for the purpose, the air finds its way through the cracks of windows and doors, or by the more easy passage of another chimney-shaft. In this way chimneys may often overpower each other. A fire in a front or back drawing room may burn very well by itself, but if an attempt be made to light both fires the rooms are filled with smoke. The stronger burning fire draws upon the shaft of the weaker for a supply of air, and of course brings the smoke down with it. If the two rooms be separated by a wall, the same effect may be produced, for they still communicate atmospherically by the joints of the doors. It is even possible, when the windows fit tightly, for a large kitchen fire to overpower all the other chimneys of the house. Dr. Franklin tells us that this happened in a nobleman's new-built mansion in Westminster, and after the owner had paid for it, he had to expend three hundred pounds to cure the defect.

The existence of these up and down draughts, as well as the

necessity for a constant supply of air to promote combustion, may be illustrated by a pleasing experiment:—

'Place a lighted taper in a flat dish, and cover it with a glass receiver, furnished with a long glass chimney placed immediately over the flame. If the bottom of the receiver does not come into very close contact with the dish, enough air will enter to support combustion, and the draught or current of hot air will escape up the chimney, and the taper will continue to burn for any length of time. If we now shift the receiver a little on one side, so that the flame may not be immediately under the chimney, the products of combustion will impinge upon the glass, and cooling down and mingling with the air of the receiver, will contaminate it so much, that the taper immediately begins to burn dimly, and will soon be extinguished. On bringing the chimney over the flame, it will speedily improve in appearance; the smoke and other products of combustion will be rapidly discharged, and the receiver will become bright and transparent as before. But suppose we cut off all communication with the external air from below by pouring a little water into the dish, so as to cover the mouth of the receiver, we shall then have the case of a room which is provided with a vent tube near the ceiling, but has no provision for admitting fresh air from any lower openings; in such case, the fresh air will seek to enter by the ventilating tube. If this be large enough, the outgoing hot air and the incoming cool air will divide the tube into two parts. But if, as in the experiment before us, the ventilating tube or chimney be too narrow, the hot and cold currents will interfere with each other; the tendency of the hot air to rise and of the cold air to descend, will prevent the escape of the one and the entrance of the other, and the taper will soon be extinguished for want of fresh air. But if the chimney be divided into two portions by a flat strip of tin plate passed down it, as in Fig. 4, and the taper be lighted and placed in its former position, it will continue to burn for any length of time; for, by this arrangement, the two currents of hot and cold air are prevented from interfering with each other; the hot air will pass up one channel and escape, and the cold air will descend the other channel to feed the flame. By holding a piece of smoking paper or the glowing wick of a taper on one side of the chimney, the smoke will be drawn down, thereby indicating the descending current of cool air; while, on the other side, the smoke will be driven up by the ascending current of heated air.'—*Tomlinson*, pp. 164, 165.

Fig. 4.

Chimneys may also smoke from local position, as when their tops are commanded by higher buildings or by a hill, so that the wind in blowing over them falls like water over a dam, and passing



passing over the tops of the chimneys, may beat down the smoke. If it is not possible to raise the funnels to the same height or higher than the eminence, the usual remedy is to place on the top of the chimney one of those uncouth forms, which render the sky-line of London houses so hideous to behold. The simplest contrivance is a revolving cowl, furnished with a wind-arrow, which causes the mouth, whichever way the wind blows, to be turned in an opposite direction. Such expedients, however, may fail in the case of reflected winds, as when an eminence is farther from the wind than the chimney commanded, in which case the wind would be pent up between the house and the eminence, and force its way down the chimney in spite of the turncap. Dr. Franklin mentions a city in which smoky chimneys were numerous in consequence of the kitchens being lower than the houses, with which they were connected by a passage. When the wind blew against the backs of the houses, the whole side of a street formed a kind of dam, and the obstructed currents were forced down the kitchen chimneys. The annoyance was greatest when the kitchen fires were burning badly, because the draught was then insufficient to carry the smoke to any considerable height.

As the full enjoyment of the open fire depends so much on a knowledge of the peculiarities of the fickle race of chimneys, we will specify a few more cases, to enable any afflicted reader to ascertain for himself the cause and cure of the evil, without having recourse to the uncertain and expensive prescriptions of the chimney-doctor. It may happen that a chimney, which would otherwise draw well, will smoke from the improper position of a door; for example, if the door and the chimney are on the same side of the room, and the door opens against the wall, a current of air will rush across the fire-place and check the draught which is flowing into it, when the smoke must descend. This is more likely to happen in shutting than in opening the door, for the force of the current is then increased. The best remedy is to shift the hinges of the door and direct the air along the other wall; but a projecting screen is sometimes sufficient to intercept the offending current.

Rooms which are not often warmed by a fire, may be filled with smoke from the chimneys of other rooms where fires are burning. This is either caused by the wind or by changes in the density of the air of the cold funnel, due to the varying temperatures of day and night. If the temperature of the outer atmosphere and of that in the chimneys is nearly the same, a current of warmer air from the room begins to ascend the shaft in the evening and continues till nine or ten o'clock next morning: as the

the heat of the day advances, the current sets downwards. When, therefore, the smoke from the neighbouring chimneys passes over the tops of those which are drawing downwards, it is sucked in with the current, and fills the room below, or gives that strong smell of soot which is familiar to every one. The inconvenience, however, since the use of the register stove, has been less felt than formerly. Chimneys, again, placed in the north wall of a house do not always draw so well as those on the south, because, being cooled by the north winds, there is not always sufficient ascensive force. The flues which are enclosed in the body of the house are protected from the chilling effects of the external air, and are thus more powerful than those in outer walls; while those which are built in stacks often draw better than separate funnels, since they lend heat to one another.

The form of the chimney-pots is of some importance. Those which are ornamented are often objectionable, the projecting portions serving as points of resistance to the wind, and reflecting it down the chimney. When the pots are grouped or clustered together they present a broad opposing surface to the blast, which, being checked by the obstruction, may rise up along it, and, blowing strongly over the mouths of the funnels, prevent the smoke from passing up through it.

Lastly, chimneys may smoke from causes which science may not be able to reach. In one case, mentioned by Dr. Franklin, a flue on which all remedies had been tried in vain was found, on taking down the wainscot, to have a crack several feet in length and some inches in width. In another case the same intelligent observer began to treat his patient with all the confidence of science:—

'I opened the door, and perceived it was not want of air; I made a temporary contraction of the opening of the chimney, and found it was not its being too large that caused the smoke to issue; I went and looked up at the top of the chimney; its funnel was joined in the same stack with others, some of them shorter, that drew very well, and I saw nothing to prevent its doing the same: in fine, after every other examination I could think of, I was obliged to own the insufficiency of my skill. But my friend, who made no pretension to this kind of knowledge, afterwards discovered the cause himself. He got to the top of the funnel by a ladder, and looking down, found it filled with twigs and straw, cemented with earth and lined with feathers. It seems the house, after being built, had stood empty some years before he occupied it, and he concluded that some large birds had taken advantage of its retired situation to make their nests there. The rubbish, considerable in quantity, being removed, and the funnel cleared, the chimney drew well and gave satisfaction.'

Some years ago a favourite method of warming an apartment was



was by means of the *stove-grate* or *chapelle*, the latter name being given from its resemblance to the chapels or oratories of cathedrals. It was set within the opening of the large square fireplace, but kept distinct from it. The sides and back of the grate were of cast-iron, and were continued down to the hearth, inclosing the ash-pit. The pipe or flue was carried up some feet into the chimney, and was hidden by the Gothic ornaments of the grate. A register, or damper-plate, was so contrived that when open the smoke might strike it obliquely and be directed with certainty into the vent without any risk of reverberating into the room. All the rest of the space above the fire was shut up by iron plates or brick-work. The fuel being in immediate contact with the back and sides of the grate, raised them to a great heat, which they communicated to the air contiguous to them; and as there was but little outlet for it above, it became diffused over the room. The effect was remarkable. Less than a quarter of the fuel consumed in an ordinary fireplace was sufficient, and there was the same cheerful blazing hearth, and salutary renewal of the air. The difficulty, indeed, was so to regulate the temperature as to prevent the room from becoming oppressively warm. Those parts of the apparatus which were in contact with the fuel became needlessly hot, and it was found an improvement to line them with thick plates of cast-iron, or with tiles of fire-clay, which, being bad conductors, moderated the heat communicated to the surrounding atmosphere. Passages were also opened in the vent, to permit the air heated by the sides of the stove-grate to ascend directly into the flue, instead of escaping into the room. It had the further recommendation that a cheerful fire was insured within five minutes, by hanging a plate of iron in front, which reached down as low as the grate, and was removed as soon as the fuel had burnt bright.

Among the newly-introduced stoves of the present day, the greater number are remarkable for brilliant reflecting surfaces. In Jobson's stove-grate, which was patented in 1848, and attracted considerable attention, the fire is surrounded by a circular parabolic reflector, which reflects the rays of light and heat into the room in parallel lines. The reflector turns upon a hinge at the side, and can be brought out like a door, for the purpose of cleaning the grate or lighting the fire. There is a concealed ash-pan, which requires to be emptied only once a-week. As the parabolic casting surrounds the grate, there is little or no passage for the air into the chimney, except through or close over the fire; but when it is required to ventilate the room, the reflector can be drawn forward an inch or two to allow

allow the air to flow in around it. This fireplace has a handsome appearance.

The Gauger principle of air-tubes and caliducts has hitherto scarcely had a fair trial. Mr. Francis Lloyd has ingeniously and successfully applied the principle to an ordinary grate, by bringing in the outer air, allowing it to circulate in tubes at the sides and back of the grate, and then discharging it into the room at the upper part of the mantel. A meritorious attempt has also been made in what is called 'Pierce's pyro-pneumatic warming and ventilating stove' to secure the advantages of the caliduct system without producing the 'burnt air' which was fatal to the success of the plan as introduced by Desaguliers. As yet this stove has been chiefly applied to the warming of public buildings or halls, where the effects of an over-dry atmosphere would be less evident: but there is much reason to suppose that the inventor's plan of placing the tubes or caliducts within masses of fire-loam, and thus avoiding all contact of the heated air with the metal, will obviate the evil. Like the Chapelle, this pyro-pneumatic stove stands within the fireplace. The air from the caliducts, which is distributed over the apartment, in conjunction with the direct heat of the open fire, produces, it is said, a pleasant temperature, with very little fuel. It is stated in the manufacturer's circular that the largest-sized stove of this description sends out twenty thousand feet of warm air within the hour, at an expenditure of four pounds weight of coal; and that half a hundred weight of coals may be taken as the consumption for the day.

A fashion has lately been introduced of placing the fire-grates lower than formerly; in some cases on the very hearth, under the idea that a low fire burns better, or gives out more heat from the same quantity of fuel, and communicates greater warmth to the feet. Dr. Arnott has shown the fallacy of this idea in a paper communicated to the 'Journal of the Society of Arts,' 14th July, 1854. After referring to the laws of radiant heat, and showing that in the common open fireplace it is from the radiant heat that almost all the warmth is derived; and that the rays do not raise the temperature of the air until they have been first intercepted and absorbed by the walls and furniture of the room, he proceeds as follows:—

'1st. The supposition that fuel burnt in a low fire gives out more heat has arisen from the experimenter finding that his hand held over the low fire feels not only the heat radiated from the fire itself, but also that reflected from the hearth close beneath it, which second portion, if the grate were high, would have room to spread or radiate downwards and outwards to the more distant floor or carpet, and to warm them.

'2nd.



'2nd. The notion that the fire, because near the floor, must warm the carpet more, springs from what may be called an error in the logic of the reasoner, who is assuming that the hearth, floor, and carpet, being parts of the same level, are in the same predicament—the truth being, however, that in such a case the hearth within the fender gets nearly all the downward rays, and the carpet almost none—as a candle held before a looking-glass at a moderate distance diffuses its heat pretty uniformly over the whole, but if moved close to one part of the glass it overheats, and probably cracks, that part, leaving the rest unaffected. A low fire on a heated hearth is to the general floor or carpet of a room nearly what the sun, at the moment of rising or setting, is to the surface of a field. The rays are nearly all shooting upwards from the surface, and the few which approach it slant obliquely along, or nearly parallel to, the surface, without touching, and therefore without warming it.

'The annexed diagram serves to elucidate these facts.

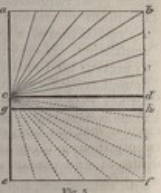

Fig. 5.

'*c* represents the fireplace or centre of radiation, with rays diverging from it into the free space around.

'*a c* the wall in which the grate is set, and which can receive none of the direct rays,—as is nearly true of the floor also, if the fire be on the hearth.

'*a b* the ceiling.

'*b d* the wall opposite to the fire.

'*c d* the floor, with the fire on or close to the hearth. If there were no floor at all, these rays would shoot as abundantly down to the bottom and walls of the room below, as to the ceiling and walls of the room above; but the hearthstone of the floor, *c d*, first intercepts all the inferior rays, and then radiates them up to the ceiling, leaving the floor unsupplied, unless by secondary radiation from the ceiling and walls.

'*g h* represents a floor at a moderate distance below the fire. It is seen, by where the ray-lines intersect this floor, that much of the heat of the fire must spread over it, and chiefly between the middle of the room and the grate where the rug is, and where the feet of the persons forming the fireside circle are placed.

'Striking proof of the facts here set forth is obtained by laying thermometers on the floors of a room with a low fire, and of a room with the fire, as usual of old, at a height of about 15 or 16 inches above the hearth. An experiment, tried in two such rooms, in both of which thermometers on the pianofortes, four feet above the floor, stood at 62°, showed the carpet, not far from the hearth, to be at 56° with the low, and at 73° with the high fire.'

'The open fire-place,' says Mr. Tomlinson, 'is so intimately connected with an Englishman's ideas of domestic comfort, that it can never be expected, while coals are plentiful, that a more economical method

method of warming our rooms will become very common. It is, therefore, the duty of scientific men to make the open fire-place as comfortable as it certainly is wholesome, and if a better method of supplying air to the fire than the present chance arrangement were adopted; if caliducts were led round the fire, so as to discharge warm air into distant parts of the room, and even over the house; if the various parts of the fire-place were of the proper shape and dimensions; there seems to be no good reason against retaining our cherished open fire, and converting it from a troublesome, uncertain, smoky, and expensive companion, into a source of health, pleasure, and economy.'—p. 95. The details into which we have entered will show how far these desiderata have been secured; but something more still remained to be done, and this has been accomplished by Dr. Arnott. The three great requisites in the open fire-place are,—first, the consumption of smoke; secondly, economy of fuel; and thirdly, the production of a proper temperature, together with effectual ventilation. None of the contrivances already described pretend to prevent the formation of smoke, or to consume it when formed. Some have effected considerable economy of fuel, and do, to a certain extent, promote ventilation; but all three objects are alone compassed by means of Dr. Arnott's last admirable invention. The subject of stoves does not come within the scope of this article, or we should have something to say upon the Arnott stove, which, when introduced fourteen years ago, was received with enthusiasm, and generally adopted; though through defects in the manufacture, want of skill in the setting, and carelessness in the management, it subsequently lost a part of its popularity. Yet, with a moderate degree of attention, it will perform all the duties which its inventor claimed for it, such as maintaining day and night, throughout the winter, from October to May, a temperature of sixty degrees or upwards, by an expenditure of 12 lbs. of coal for 24 hours, or about one-fourth the quantity required for the maintenance of an open fire for fifteen or sixteen hours. Dr. Arnott, finding that the sympathies of Englishmen were opposed to the introduction of a close stove into rooms, next directed his talents to the improvement of the open fireplace. His first resolve was to make the fire consume its own smoke, and it occurred to him that, if instead of putting the coals on the top of the fire, where the bituminous matter, exposed to the heat below, evaporates as visible smoke, the fresh coals were introduced from *below*, the vapour of pitch and other gaseous products rising up through the burning mass would be consumed, and thus the products of combustion, instead of those of distillation, would pass into the chimney. But as there has never lived



lived a more lucid exponent of science than Dr. Arnott, we cannot do better than allow him to speak for himself:—

'Common coal is known to consist of carbon and bitumen or pitch, of which pitch again the elements are still chiefly carbon and hydrogen, a substance which, when separate, exists as an air or gas. When the coal is heated to about 600° Fahrenheit, the bitumen or pitch evaporates as a thick, visible smoke, which, when it afterwards cools, assumes the form of soot. If that pitch, however, or pitchy vapour, be heated still more, as it is in the red-hot iron retorts of a gas work, or in rising through a certain thickness of ignited coal in an ordinary fire, it is in great part resolved into invisible carburetted hydrogen gas, such as we burn in street lamps. Now when fresh coal is thrown upon the top of a common fire, part of it is soon heated to 600°, and the bitumen of it evaporates as the visible smoke, which immediately rises. Of such matter the great cloud over London consists. If the pitchy vapour be heated to ignition by the contact of a flame or of ignited coal near the surface, it suddenly becomes in great part gas, and itself burns as flame. This is the phenomenon seen in the flickering and burning which takes place on the top of a common fire. But if fresh coal, instead of being placed on the top of a fire, where it unavoidably must emit visible pitchy vapour or smoke, be introduced beneath the burning, red-hot coal, so that its pitch, in rising as vapour, must pass among the parts of the burning mass, it will be partly resolved into the inflammable coal gas, and will itself burn and inflame whatever else it touches. Persons often amuse themselves by pushing a piece of fresh coal into the centre of the fire in this way, and then observing the blaze of the newly-formed gas.'

Dr. Arnott found that a patent for a plan somewhat similar to his own had been taken out by Mr. John Cutler (January, 1815); but his patent-right was contested with success, and as the apparatus was expensive, complicated, and liable to get out of order, it was soon abandoned. In Dr. Arnott's improved scheme, in the description of which we freely borrow from the account which has been published by the inventor, the charge of coal required for the day's consumption is placed in the fire-box *e, f, g, h*, fig. 6, and the coal is raised upwards, as it is wanted, by means of a piston which forms the bottom of the box, the piston being worked by the poker as a lever. The piston-rod is furnished with notches, in which the point of the poker is inserted, and a ratchet-catch supports the piston when the poker is withdrawn. The coal-box may be seven or eight inches in depth, and will contain from twenty to thirty pounds of coal, according to its area. In winter the coal may be heaped an inch or two above the mouth of the box, and in mild weather the charge may be diminished by not allowing the piston to descend to the bottom. If the charge of coal should be consumed, and

it

it be required to refill the box without allowing the fire to go out, a broad flat shovel, of the shape of the bottom of the grate,

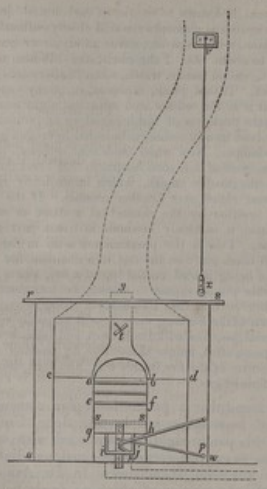

Fig. 6.

is pushed in upon the piston, the flat surface of which will now be flush with the bottom bar of the grate, *e*, *f*. The burning coals being thus supported, the piston is let down to the bottom of the box, for the reception of the new charge of coal. This being shot in, the spade is withdrawn. The fire can be lighted easily and quickly: the paper and wood are laid on the top of the coal, with a layer of cinders to the thickness of three or four inches. While the wood is burning and igniting the cinder, the heat raises from the coal below a pitchy vapour which increases the blaze; a little smoke now ascends into the chimney, but as soon as the cinders are fairly ignited the vapour becomes converted into gas, and the smoke ceases. It is not the least merit of this contrivance,



contrivance, that as no soot is deposited, the chimney will not require sweeping.

It is essential to the success of this contrivance that the piston fit the coal-box pretty accurately, so that no air be allowed to enter at the bottom; the combustion is thus confined to that part of the fire which is exposed to view, namely, between the bars of the grate and near the top of the coal-box. When nearly all the coal which is surrounded by the bars has been consumed, the air will dive into the box and keep up a gentle combustion, until the remainder of the fuel is burnt up. The fire may thus be kept in for a whole day or a night without requiring to be stirred, and yet in a moment, on raising the piston, a good blaze will burst forth. If a more active combustion is desired, it can be immediately produced by letting in an increased quantity of air, for which purpose there is a slide in a small door in front of the lower part of the coal-box. The fire may be extinguished by taking out the few lumps of caked coal which remain in the fire-box, or it may be left to exhaust itself. A defective construction of the piston, or an accidental injury to the ratchet, may be the source of occasional failures in the action of this apparatus.

The saving of fuel is effected by a peculiar contrivance. We have already seen that a large proportion of the matter which passes up the chimney-shaft does not consist alone of the products of combustion, for these are diluted with the air which is constantly streaming towards the fire. Now it is evident that if the smoke were discharged into the chimney without making the ordinary demand upon the warmed air of the room, we should have the benefit of its heat for a longer time. To effect this Dr. Arnott placed over the fire a cover or hood *y a b*, so arranged as to prevent more air mixing with the smoke than was required for the combustion of the inflammable gases. The saving he found was from one-third to half of the fuel previously required to maintain the desired temperature. In a room 15 feet by 13½ feet by 12 feet, with two large windows, the coal required to maintain a temperature of 55 degrees in the coldest winter day was 18 lbs. for nineteen hours. Dr. Arnott remarks, that 'under the present imperfect forms of open fire, the whole of the hot smoke passes away as certainly as here; but that at present it is so much diluted with the colder air of the room, that ordinary observers do not perceive, and consequently do not regret, the fact.'

The saving of fuel might be increased by making the smoke do duty before it is finally dismissed into the chimney. If, for example, it were brought into contact with a vessel containing

taining water or colder air, it would give up a considerable portion of its heat; thus the hood itself may be made a boiler or water vessel. In some cases the contraction of the space over the fire may be better made in brickwork than in metal, or the metal may be lined with tile to prevent the 'burnt-air' smell. The bottom of the chimney should be closed by a plate or other means, that no air may enter except through the hood. Through this plate the stalk of the hood passes tightly at *y*, and the stalk is furnished with a throttle valve or damper at *t*, for regulating the supply of air. The handle which moves the damper is accompanied by a plate or card, graduated to show the position of the valve. When the valve is quite open the chimney quickens the combustion, like that of a blast furnace; but by closing the valve, the fierceness of the fire is diminished. The chimney-flue above the upper opening of the hood should be furnished with slanting sides, so as not to harbour dust or soot; for if the fire be carelessly used, soot may, of course, be formed.

It may now be asked what becomes of the ventilation of the room, if the air does not rush into the fireplace, as under ordinary circumstances? To this we answer that an Arnott valve, placed in the chimney close to the ceiling, is necessary in every room which is occupied by human beings, in order to prevent the air, poisoned by the process of respiration and by the combustion of lamps and candles, from being breathed over again. The action of the hood fortunately renders the Arnott valve, which was before uncertain in its operation, invariably effectual; for since the hood restores to the chimney its proper function of carrying off only the highly heated products of combustion, the hot ascending column improves the draught of the chimney, and the comparatively colder air near the ceiling of the room forces open the ventilating valve. Such a valve is shown at *v* in the figure; it is balanced nearly on its centre of gravity, that the least pressure of air from the room may open it inwards, while any pressure from within the chimney occasioned by a down draught closes it up. Attached to the valve is a wire, furnished at the bottom near the mantel *r s* with a screw or loop-peg *x*, to allow of its being partially or wholly closed. Beneath the hearth is a channel, shown by dotted lines, for conveying fresh air from the outside of the house: it enters the room under the fender by which it is warmed before it diffuses itself through the room—a means of economising heat as ingenious as it is original. This air-duct is also furnished with a regulating valve.

The small quantity of air which passes into the chimney in a fire-place thus constructed greatly diminishes the cold draughts from



from doors and windows. As there is no soot the chimney cannot possibly catch fire; and even if it could, it would be extinguished by closing the hood-valve. Smoky chimneys are effectually prevented. The danger from light muslin dresses igniting by being blown towards the grate on the opening of the door, is entirely cut off; for there can be no rush of air when the fire is well supplied from the duct below the fender. Neither is there any risk of sparks from exploding pieces of coal, since all the coal is coked in the coal-box before it is raised to view. The strong draught of a large kitchen or other fire cannot overpower this chimney; which may, on the contrary, by means of a connecting tube, be made to ventilate a distant room, staircase, cellar, or closet. It is another advantage of its improved draught that fires can be maintained without inconvenience in upper rooms, as well as in low houses and cottages. When the fire is stirred, the hood-valve, by being opened more widely, will occasion such an increased current as to carry off dust, while the chimney-valve will allow a room, without overheating, to be lighted with gas, and will prevent explosions from its escape by not allowing it to accumulate. Any kind of coal, coke, culm, or coal-dust may be used, for the fumes which render some sorts objectionable in ordinary grates are carried off by the powerful action of the hood. It should, however, be stated that the brightness produced is rather that of coke than of coal, and that although it is easy to excite rapid combustion, yet the flame is pale and different in character from that of the ordinary fire.

It is certainly an advantage of these arrangements that they can be applied to a common grate in an ordinary fire-place. It was asserted by one of the speakers in the course of the discussion at the Society of Arts, after the reading of Dr. Arnott's paper, that 'he believed that the old grates might be adapted to Dr. Arnott's principle by an outlay of 25*s.* or 30*s.*; and grates, for very common purposes, might be so adapted at even a smaller cost.' As this statement has been very widely circulated, and is calculated to injure the plan which it was, doubtless, intended to promote, we think it right to mention that the cost will be much more considerable. Two manufacturers offer to supply grates on the new construction—one for 4*l.* 10*s.*, the other for 5*l.* A third in his circular offers them for 2*l.* 10*s.*; but when we last inquired he was not yet provided with any at this price. When the new grate is bought, the *fixing* is likely to be costly: in some cases the hearthstone has to be cut through or pulled out to allow the piston-rod to work, and the air-duct, &c., may lead to considerable outlay. It is necessary, therefore, to have an estimate of the whole expense before the alterations are commenced; but

but we can safely affirm that when once the householder has passed through the ordeal of floors and hearthstones disturbed, and grates reset, he will be amply repaid in the improved state of domestic comfort, health, and cheerfulness. And it must be added, that many of the difficulties and expenses accompanying the introduction of new forms of apparatus diminish as the arrangements become familiar to workpeople. Already it has been found that the cost of the Arnott fireplace has lessened with the increasing knowledge of his plan. Its extensive introduction during the present winter into both public offices and private dwellings, and the bestowal of the Rumford Medal on the inventor by the Royal Society, are the best proofs that he has not laboured in vain.

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ART. VII.—1. *Report from the Select Committee on the Friendly Societies' Bill; together with the Minutes of Evidence, &c.* House of Commons, July, 1854.

2. *An Act to consolidate and amend the Laws, and to grant Additional Facilities in relation to the Purchase of Government Annuities, &c.: to which is added, Tables of the Rates of Government Annuities.* Printed by Authority of the National Debt Commissioners, 1853.

3. *Copies of further Report and Tables prepared under the direction of the Lords of the Treasury, by the Actuary of the National Debt Office, on the subject of Sickness and Mortality among the Members of Friendly Societies, as shown by the Quinquennial Returns to the 31st day of December,* 1850. Presented to the House of Commons, August 11, 1854.

OF all the instinctive principles of human nature which are found to develop themselves with activity in civilized society, there is perhaps none at once more powerful, universal, and beneficial, than that which suggests the provision of resources against the wants of the future. The bee and the ant afford typical examples of this instinct among the lower order of animals, and in its simplest form. In the case of man it assumes the additional shape of a propensity to lay by, or *save*, not with a view to the preservation of life only, but likewise to the command of an abundance of the means of enjoyment. In one or other of these shapes it is the source of all that accumulated stock of wealth which distinguishes civilised from savage life, and constitutes the essential element of material prosperity in a people.

The universality of this saving spirit, and the extent to which it is sure to develope itself under favourable circumstances, have not,



the depositors will be confined individually to very small sums, and will in future belong exclusively to the poorer classes, who might, with sound policy, be encouraged in habits of economy, even at some pecuniary sacrifice on the part of the State. It should be recollected, too, that the State charges 3½ and 4 per cent. on its loans to the wealthy classes, on the very best security, and may therefore well afford to pay rather more than 3 per cent. to its poor creditors. Looking also to the vast saving in the cost of crime and indigence which must be occasioned by the habitual accumulation of small savings among the poorer classes of society, a few thousands a year might be wisely risked in its encouragement.

It is very desirable that in making the considerable alteration now unavoidable in the system of savings'-banks the opportunity should be taken of consolidating all the Acts relating to them into one statute; and we would urge the same likewise with respect to the Friendly Society Acts. Indeed, the Committee of the House of Commons which sat upon this last subject in the past session were evidently prepared to recommend such a consolidation, if time had allowed its preparation. If, as we trust will be the case, the Legislature should carry at once into effect the remaining improvements here suggested in the laws which relate to these valuable provident institutions, we shall entertain sanguine hopes as to the result. The higher and wealthier classes will no doubt, in the active spirit of benevolence which characterises the age, do their best, by advice, explanation, and assistance, to encourage their poorer neighbours, friends, and workpeople to avail themselves of the advantages thus offered to them. We scarcely see what should prevent any adult individual of the industrious classes from becoming a member of a friendly society which shall ensure him medical aid and a maintenance in sickness, and a respectable funeral on his death —the holder of an assured Government Annuity in his old age; and also of an annually-increasing fund in the savings'-bank, for ultimate investment, perhaps, in some active business, or to be bequeathed as a future provision for his widow or children. All this is within the reach of every frugal and prudent person who prefers to present gratification the consciousness of a secure provision against the wants of the future; the certainty of an independent maintenance in the evening of his days; and the reasonable prospect of an improvement in his position of life.

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ART.

ART. VIII.—*A Month in the Camp before Sebastopol.* By a Non-Combatant. London, 1855.

IT will be our object in the following pages to place before our readers, as far as we are able, a truthful history of the expedition of the allied armies to the East. To assist us in doing so we have availed ourselves of original documents and journals kept on the spot, and we believe that we shall be able to throw some light upon events which are still obscure or misunderstood. In venturing to criticise any portion of our operations, we are not unmindful of the military maxim attributed under various forms to so many great commanders, 'that war consists of a series of blunders, the victory remaining with him who commits the fewest.' At the same time we consider that we have a full right, without exposing ourselves to the charge of faction or of presumption, to comment upon and examine the movements of our army, and the results hitherto attained by the expedition in which we are engaged.

War having, on the 27th March, been declared against Russia, the allied fleets, already in the Baltic and Black Seas, were free to attack the enemy. The first act of hostility of any importance in which we engaged was the ill-executed and useless bombardment of Odessa. The reason assigned for this measure was unnecessary and absurd. The firing upon a flag of truce, however gross a violation of the law of nations, was not needed as an excuse or a justification for a well-conducted attack upon so important a town. Had it been so, we should have been engaged in an act of revenge, and not of war. Odessa is both a commercial and military depôt—the great storehouse of southern Russia. Its granaries, which in time of peace supply half Europe with corn, furnish in time of war the means of subsistence to vast armies. As a station, therefore, midway between the Principalities and the southern Provinces of Russia, its destruction becomes almost a necessity before military operations can with any prospect of speedy success be undertaken either on the Danube or in the Crimea. The place has no historic traditions. Its inhabitants are chiefly, if not exclusively, engaged in trade, or connected with the Imperial military and naval establishments. The claims of humanity might have been amply satisfied by summoning the garrison to lay down their arms and to surrender the government stores and public granaries, and in the event of a refusal by giving the inhabitants sufficient time to depart with their property before commencing a bombardment or an assault. After



After the place had been taken or destroyed—which we presume it would have been without much difficulty—two or three ships of war, stationed in its secure anchorage, would have prevented the reconstruction of any new defences, and, to a certain extent, the passage of any fresh troops. It is impossible to overrate the importance this check upon the movements of the enemy would have been to the allies. From the vast granaries of Odessa the Russian armies have been supplied. It has served as a resting place and has furnished the means of transport to those reinforcements which have been poured into the Crimea and are now arrayed against us. Our attack upon it was ill conceived and ill executed. The threats we had vauntingly made were not fulfilled. The allied fleets retired having but half accomplished their object, as announced to the Russian commander—the destruction of the batteries and the ships in the harbour. Some pretext was thus afforded to the enemy to boast that we had been driven away by the vigour of his defence. For the first time we were made aware of the merits of the Russian artillery. Our own navy bear willing testimony to the skill and courage with which the batteries were defended, and readily admit that the honours conferred upon the officer who commanded in them were well bestowed.

On the 12th of May the Tiger, whilst cruising off Odessa in a thick fog, grounded about four miles from the town. As soon as she was observed, the Russians opened a fire upon her with field guns. Her commander, Captain Giffard, having been mortally wounded, the officers and crew surrendered themselves prisoners of war, no effort having, it seems, been made to destroy the ship or to escape in her boats, although two English armed steamers were known to be near. Even the flags and ship's papers were allowed to fall into the enemy's hands, and furnished him with the first trophies of the war. There is reason to believe that the heavy guns were subsequently removed from the wreck and turned against us at Sebastopol.

It would appear that up to this time the British Government had decided upon no definite plan of operations, although they had despatched troops from this country to the Mediterranean. They had neglected to obtain any information as to the strength and position of the Ottoman troops under Omar Pasha; they remained in almost complete ignorance of the nature of the momentous struggle then taking place on the frontiers of the Principalities. It was not until months after hostilities had actually broken out between the Czar and the Porte, that Sir John Burgoyne was sent to Bulgaria to report to the British Government upon the state of the Turkish army. The condition of

of the Ottoman troops, so different from that of English soldiers, and the numerical superiority of the Russian forces, led him to anticipate not only the speedy fall of the fortresses on the Danube, but the advance of the enemy upon Adrianople. Convinced that Omar Pasha could not meet the Russians in the field without running the almost inevitable risk of a defeat, which might end in the total destruction of his army and an uninterrupted march upon the capital, he not only advised the abandonment of the line of the Danube, but even expressed his doubt as to the possibility of the Turkish commander being able to hold that of the Balkan. The danger appeared to him so imminent that he recommended immediate measures for the defence of Constantinople and the Dardanelles. He suggested for that purpose a line of defences across the Tauric Chersonese. It was, we have reason to believe, the urgency of the danger to the Turkish capital, as represented by Sir John Burgoyne, which induced the Emperor of the French to send without delay a body of troops to Gallipoli.

Notwithstanding the anticipations of Sir John Burgoyne, founded, no doubt, upon an accurate estimate of the numbers and condition of the Turkish troops, though not upon a sufficient knowledge of their peculiar character, and of the qualities of their able commander, the fortresses and works on the Danube were held with extraordinary courage and determination, and the Russians were foiled in every attack upon them.

Up to this time we had merely thought of guarding the capital against a *coup-de-main;* the possibility of a war, if we were to judge by their deeds, appears scarcely to have been contemplated by the Government; on the contrary, they still acted as if they entertained more than hopes of peace. But the courage displayed by the Ottoman troops at Kalafat, Citate, Giurgevo, and Silistria had excited general sympathy and admiration, and the people of this country began to perceive that although making professions of alliance and friendship to the Sultan, we were permitting his army to wage an unequal warfare on the Danube, whilst our own remained inactive at Gallipoli and Scutari; Ministers, therefore, yielding as usual to the popular feeling, decided upon taking one more step in advance, and our troops were ordered to Varna. Notwithstanding repeated and most urgent remonstrances, every measure necessary to fit our army for a campaign had been neglected. On the arrival of our troops at Gallipoli it was found that no preparation whatever had been made for their reception. The want of boats for landing, of commissariat, and of proper interpreters to communicate with the authorities and the inhabitants of the country, caused great delays



delays and embarrassment, which were, it will be remembered, severely commented upon in England. It might have been hoped that the results of this culpable neglect would have proved a warning for the future; but so far from such having been the case, our army was hurried to Varna without any better arrangements for its disembarkation or its future employment. Ministers had been forewarned, that, owing to the presence of two vast armies, the northern provinces of Turkey in Europe were destitute of almost all necessary supplies, as well as of the means of transport absolutely required by an army entering upon a campaign. The fatal nature of the climate in the neighbourhood of Varna was especially pointed out to them. The wooded valleys and marshy lakes near the town are the hotbeds of the most pernicious fevers; and it was foreseen that if the pestilence which then threatened Europe were unfortunately to fall upon the British army, it would on such a spot show itself with tenfold virulence. We have been credibly informed that before a position for encamping our troops was selected, a German doctor, who had been long connected with the Turkish quarantine establishments in Bulgaria, and was consequently well acquainted with the climate of most parts of that province, was requested to frame a sanitary map of the country. On this map, whilst many places were indicated as 'très malsain,' Devna and the neighbourhood of Varna were denoted 'pestilentieux'! These localities were chosen for the encampments of our devoted troops, who were landed without any means of transport to enable them, even if required, to move ten miles into the interior!

It has been said that the presence of the allied armies at Varna encouraged the Turks in their heroic defence of Silistria, and compelled the Russians to raise the siege; the moral effect of our presence thus avoiding the necessity of an advance. Admitting this assertion to be true, it is no justification of the conduct of those who sent our troops there with the express intention of giving effective aid to the Ottoman army, but without the means of making a forward movement or of entering upon a campaign. The sudden raising of the siege of Silistria, to whatever cause it may be attributed, was to us a matter of equal surprise and congratulation.

The terrible history of the visitation of the cholera amongst our troops will be fresh in the memory of our readers. The British army had been reduced, not only by this scourge, but by a prolonged state of inactivity, and by the enervating effects of the pestilent climate of the valleys in which they were encamped, to a state of despondency—we might almost write

despair

despair—which it would be difficult to describe. A regiment consisted of but three or four hundred weak, sickly men. Those who had been the strongest, tottered under the weight of their knapsacks. With a sad countenance our soldiers wandered through the silent camp, or sat listlessly watching the mournful processions which never ceased moving towards the spreading grave-yards. Those who yet lingered on prayed to be led, at whatever risk, against the enemy, rather than be left to die an inglorious death.

Ministers were pressed anew by the popular clamour; they felt that another effort was necessary to save themselves from the result of their uncertain and tardy policy. They hastily, to judge again by their conduct, determined upon an expedition to the Crimea. At length the orders to prepare for embarkation were communicated to the allied armies. The prospect of speedily facing the enemy had the effect which might have been anticipated on British troops. The general despondency was turned to hope. Men who had been scarcely able to drag their weary limbs from tent to tent, gained almost instantaneous strength, and the voice of merriment and the bustle of preparation were once more heard in a camp which for weeks had been sad and silent as the grave.

It was not, however, until the 7th of September that the allied fleets sailed for the Crimea. There had been numerous causes of delay. The means of embarkation and disembarkation had not been provided. We had deferred to the last moment the construction of the proper boats for landing our artillery and cavalry. Through the exertions of Sir Edmund Lyons, who proceeded to Constantinople and personally superintended and hastened the arrangements, the English troops were at length enabled to embark—an operation which was effected without accident through the admirable management of the officers and seamen of the fleet. Owing, however, to some backwardness on our part, the French were ready and sailed from Varna two days before us. With the Turkish squadron they were to await us off Cape Tarkan. In the meanwhile Sir Edmund Lyons, Lord Raglan, General Canrobert, and several of the officers of the staff of each army, proceeded in the Agamemnon, the Samson, and Caradoc, to examine the western shores of the Crimea, with a view to find a suitable spot for landing the allied armies. A previous survey had been made of the same coast by a detachment of the British and French fleets. The enemy had observed from our movements that attention had been especially directed to the mouths of the Alma, Katsha, and Belbec rivers; accordingly, the 'Terrible,' on revisiting the coast a short time after, found



found troops assembled and works commenced at all these places.

All idea of attempting a landing to the south of Sebastopol had been abandoned, the precipitous nature of the southern coast forbidding any safe anchorage except in the small harbour of Balaklava, into which, if even weakly defended, it would be almost impossible to force an entrance. The deep bays in Cape Chersonese were too near to Sebastopol. It remained, therefore, to find a suitable spot to the north of the town.

In choosing a place for landing, two things were essential—a low shelving beach, protected as far as possible from the prevailing winds, and an adequate supply of fresh water, not only at the point of disembarkation, but at regular intervals on the road to Sebastopol for the troops during their projected march. The coast between Sebastopol and the small stream of the Bulganac is formed by high cliffs of earth opening into narrow valleys where the Belbec, Katsha, and Alma fall into the sea. The mouths of these rivers would have afforded suitable landing-places, but it was of the utmost importance to disembark our troops—the greater part of which had not been under fire before—without exposing them to loss when unable to offer any resistance to the enemy. To the north of the Bulganac the undulating steppe subsides into a low champagne country. Here and there, as it approaches the coast, it falls even below the level of the sea, which has encroached upon the land during the tides caused by heavy gales from the south, forming extensive lakes or lagunes, separated from the main by narrow banks of sand and shingle thrown up by the waves. A small bay, near one of these lakes, about twenty miles to the south of Eupatoria, was chosen as the most favourable spot for the disembarkation of the allied armies.

On the morning of the 11th of September the French and Turkish squadrons—twenty-nine stately ships—were sailing majestically in order of battle, within sight of Cape Tarkan, the appointed place of rendezvous. They were waiting the junction of the British fleet, which, with its vast convoy of transports—near four hundred sail—now rode at anchor in the open sea about forty miles to the northward, their tall masts and slender spars seen far and wide above the motionless waters. Line-of-battle ships, steamers, and merchantmen lay side by side, each bearing its living burden. Amongst them glided the swift galleys of the men-of-war; flags of many colours, signals to distant vessels, fluttered in the morning breeze. As the sun appeared, the rolling of drums, the braying of trumpets, the sounds of martial music, and the clashing of arms filled the air. Never had

had the naval power of England and her infinite maritime resources been so proudly displayed.

The three war-steamers having accomplished their mission on the coast now returned to their appointed stations; the Agamemnon, winding her way snake-like through the crowd, dropped her anchor near the admiral's ship. A last council of war was held on that eventful morning, on board the Caradoc. After an animated discussion it was decided that the fleet should sail without further delay, and that a landing should be effected on the spot we have described. It is not perhaps one of the least remarkable facts in the history of this expedition, that, *after* the embarkation of the allied armies and the departure of the fleets from Varna, doubts should still have been entertained as to the practicability of a descent upon the Crimea; and that it was only at the very last moment that it was decided to persevere in the enterprise. No time was now lost in making the general signal for sailing. Innumerable flags responded to the order, and sent it from vessel to vessel. Suddenly the dark smoke rose from a hundred chimneys, and numberless white sails glittered in the sun. The moving mass now gradually formed into seven long lines, the outermost consisting of men-of-war to protect their charge from the enemy.

During the night a squall scattered the convoy, and in the morning most of the sailing vessels were far out of sight. An adventurous enemy might, with fast steamers, have inflicted an almost irreparable injury upon us, but no enemy appeared. Towards evening the straggling transports were again brought together, and were anchored for the night off a low coast about 15 miles to the north of Eupatoria. On the following morning the French and Turkish squadrons joined the British fleet, and the signal to weigh having been made at daybreak, the armada was once more in motion. A fresh breeze from the land filled the broad sails of the men-of-war as they glided by a low coast rich in villages and heaps of corn. In the afternoon the order was given to anchor in Eupatoria Bay. The town was soon after summoned, and, being without the means of defence, at once surrendered. It was not, however, formally occupied until two days after.

Several days having been lost by needless delays, the commanders of the allied forces were now impatient to effect a landing. Admiral Dundas unfortunately changed at the last moment the preconcerted plans. Much confusion, and consequent loss of valuable time, ensued, which might have led to serious results had our operations been opposed by the enemy, and



and which subsequently proved the source of considerable inconvenience. The order of disembarkation was similar to that of sailing; they had both been devised by Captain Mends, the flag-captain of the Agamemnon, a most able and energetic officer.

Never had so large a fleet been brought together, and never had the power of steam been employed on so vast a scale. The sailing vessels were divided into squadrons or detachments; two being allotted, with a few exceptions, to each merchant steamer. The whole were then formed into seven lines, the inner or that nearest the coast bearing the light division, the first division coming next, and the others following in their order. Beyond the infantry were the cavalry and the transports with the heavy guns of the siege train. The grand reserve magazines were outside the whole. Each division was distinguished during the day by its flag, and at night by the number of lights at the mizen. In addition, each vessel had the number of the regiment and the nature of the troops it bore marked in large letters on her side. The Agamemnon, Sanspareil, Diamond, and the remainder of the squadron, under the immediate command of Sir Edmund Lyons, with the small steamers to be used for towing and for disembarking the troops, kept the inshore station; whilst Admiral Dundas, with the rest of the fleet sailing outside the whole convoy, were to protect it to seaward from the enemy. To every division was, moreover, attached a steamer of war to render any assistance that might be needed. The boats of each vessel were so told off that had the original plan not been unhappily changed, the whole British force could have been disembarked, even under fire, in one day. Every boat had its appointed place and crew, and the clearest directions were given to the officers in charge and to the men under their command, to avoid confusion in the event of any attempt being made to oppose the landing. These directions were communicated to each commander, accompanied by a sketch of the positions to be taken up by all the vessels.

At midnight the anxiously expected signal was given, and the steamers and transports bearing the light division weighed and formed into line. To prevent confusion, each division succeeded at an hour's interval. The Agamemnon, hurrying to and fro, hastened the tardy, brought up the stragglers, and maintained the order of sailing. The rapid motions and skilfully directed evolutions of this magnificent vessel—as much under control as the smallest ship's-boat—excited the wonder and admiration of the fleet, and earned for it the soubriquet, which it afterwards bore, of 'Lyons' brougham.' The two admirals, Dundas and Hamelin, were, by previous agreement, to take up a position together

together in the middle of the bay chosen for the landing-place, thus dividing it into two equal parts for the convenience of the two armies. The French commander first approached the shore, and, not adhering to the original plan, anchored at the northern extremity of the bay, thus appropriating the whole to his troops. The change, though unexpected, was advantageous to both armies, as they could not have disembarked together in so small a space without considerable disorder. The Agamemnon sought an anchorage about a mile to the northward, opposite a broad lagune, which afforded an effective protection to our men on the land side. It would have been useless to wait for the British admiral, who did not leave Eupatoria until nearly the middle of the day, when he anchored far out to sea, where he remained during the disembarkation. Admiral Hamelin had boldly brought his vessel close in shore, and her boats were amongst the first which touched the enemy's coast. The general departure from the preconcerted arrangement gave rise to much confusion. One transport, containing the artillery, grounded on the coast; several vessels fouled one another; and the order of sailing having been broken through, few took up the places allotted to them. Our allies had already been engaged for nearly two hours in disembarking troops before we were able to land a single man.

No attempt whatever was made on the part of the enemy to interrupt our operations. The inhabitants of the country appeared scarcely to notice the invader. Carriages rolled along the high roads, and long strings of carts bore the produce of the fields to the villages. An officer, escorted by a small body of Cossacks, rode down to the sea-shore. Dismounting, he seated himself upon the beach, and, taking out his tablets, appeared to be making careful notes of the proceedings of the allied fleets. In this occupation, although within gunshot, he was not disturbed.

The signal having at length been given to commence landing, boats laden with men darted from the sides of every vessel. Amongst the first to tread the enemy's shore was Sir George Brown. Accompanied by a detachment of riflemen, he advanced to a ridge overlooking the open country. A party of Cossacks were driving inland a convoy of carts laden with provender and corn. A few shots, and the advance of a small body of troops of the line, soon drove the horsemen from their charge. The waggons thus captured formed the nucleus of a native transport service, which, however defective, proved of the greatest use in our subsequent operations. From information afforded by the drivers, and by many peasants who afterwards came to our



our camp, it appeared that the native population was by no means well affected to the Russian government, but that, on the contrary, it was not unwilling to welcome the invaders. A barbarous policy had almost destroyed the Musulman race. No descendants of the khans or chiefs who once ruled over the Tatar tribes are now to be found in the Crimea; they migrated long ago to Turkey. The last link between the Crim Tatars and this country had been of late years broken by an imperial edict, which forbade Mohammedans seeking employment in the Turkish service, as had formerly been their wont. But probably the source of greatest discontent was an ukase prohibiting the pilgrimage to Mecca—a religious duty imposed upon all true believers. By these vexatious restrictions it had evidently been the object of the Russian government to put an end to all connection between the Musulman inhabitants of the two empires. The Tatar families still inhabiting the Crimea are neither wealthy nor powerful. The warlike character which once distinguished the race has been completely destroyed. The men were long since disarmed, and scarcely a knife has been left them. From them, therefore, whatever may be their feelings toward us, we could not expect any material help. At the most they could only bring us supplies for our army, and afford us such information as we required regarding the nature of the country and the position of the enemy.

The Crim Tatars have long since abandoned their nomade life, and now reside in villages; but their huts are rude and ill-built, and their habits still bear the traces of their former wandering life. Their language is a hard guttural Turkish, nearly resembling that of the tribes of northern Persia. They retain to a remarkable degree the peculiar characteristics of the ancient races of Central Tatary—the high cheek-bone, the long, narrow, oblique eyes, the flat nose and dilated nostrils, the thick lips, and square squat figure. As a party of village chiefs drove into the camp in their primitive covered waggons, their grotesque appearance at once called to mind those well-known groups on our domestic china. The Tatars of the Crimea still use the two-humped camel, that beast of burden peculiar to the great deserts of Central Asia. Unlike the Arabs, they train these animals to draught.

The sailors of the fleet, encouraged by the example of their officers, worked with unremitting energy and zeal. Two small steamers, the Minna and Brenda, built for the navigation of the Danube and purchased by Sir Edmund Lyons, did good service, each landing at one trip a whole regiment of the line. Before nightfall 20,000 infantry, 36 guns, and a large number of horses, mostly belonging to the staff, were disembarked without accident.

The French had landed nearly the same number. Forty thousand armed men, with a powerful force of artillery, were thus thrown in one day upon a hostile coast, a fact unprecedented in history, and the successful accomplishment of which forms an important epoch in the annals of the art of war. The power of steam in effecting a sudden descent upon an enemy's country by sea was fully established.

During the night, a strong breeze springing up from the southward, a surf set in which retarded the landing four days, and caused some loss in horses and boats, giving the allies reason to regret the many inexplicable delays which had occurred on the passage from Varna. On Monday the 18th the armies were ready to march.

As yet, with the exception of a few isolated Cossacks who watched the movements of the allied armies, no Russian troops had been seen. The invaders were allowed to establish themselves without any opposition whatever on Russian soil. The steamers sent to reconnoitre the coast had reported that a strong camp had been formed upon the heights to the south of the Alma, but between the place of landing and that river there was no trace of the enemy. This apparent want of vigour created general surprise. Although the landing could not, perhaps, have been prevented, yet by a determined opposition great difficulties might have been thrown in the way of the allies. Owing to our want of cavalry, field batteries, judiciously placed, might have materially impeded our operations. The British troops, who, from forming the left wing and marching inland, were most exposed to attack, had so little experience in campaigning, their stragglers were so numerous, and their pickets as yet so little acquainted with their duties, that an active body of cavalry might have caused them great loss. The Cossacks have not sustained their ancient reputation. They have rarely been employed during the campaign, and have never stood, even before a very inferior force. Our soldiers soon began to treat them with contempt, and a story was some time afterwards current, when the army was before Sebastopol, of a private armed with a stick only who made one a prisoner and brought him to the British camp.

The want of proper means of transport was felt as soon as the troops had landed. The tents which had been given out to the various regiments on the second day were re-embarked before the army marched, because they could not be carried. Nearly three weeks elapsed before they were again issued; the men were consequently exposed to cold and heavy dews at night, after the oppressive heats of the day. The results were inevitable. Cholera soon broke out with fresh virulence; dysentery and diarrhœa spread



spread through our ranks. There were no means of moving the sick. The ambulances or waggons constructed for this purpose, of which so much had been heard, and to which appropriate places in each division had actually been assigned in the memorandum issued by the head of the medical staff, had been left behind. Those men who fell exhausted were left to die by the roadside. The want of transport was felt in a thousand other ways. Owing to it the regimental officers were compelled to carry their own baggage and provisions for three days. Many men of weak health, some still suffering from the effects of cholera and fever, sank under this hardship; hence the large number of deaths amongst the officers as compared with the men. The French army has not been exposed to this disadvantage. Its officers have not passed a day without their tents, nor have they had to bear a load upon their backs, it being well known that an officer thus hampered cannot efficiently discharge the numerous duties which devolve upon him. Nor has the soldier suffered from want of covering, for each man carries with him part of a small tent, which, when fastened to the other parts carried by his comrades, forms an efficient shelter from cold and rain. These small tents are even used by the pickets. They were invented by the men themselves, and are universally adopted in the French army. Perhaps when war is over, and they are no longer needed, we may begin to think that they might be beneficially introduced into our own.

To explain the reason why the French possessed the means of transport, it is said that they sent a smaller army by 3000 men than we did to the Crimea. But it must not be forgotten that even in proportion to the troops embarked their ships were greatly inferior to ours in number and size. Instead of those gigantic steamers, which bore a regiment of foot and sometimes almost a regiment of cavalry, they had but vessels of small tonnage, mostly Genoese, Sardinian, and even Turkish brigs. And yet they not only brought with them such baggage animals as were absolutely necessary, but ambulances for the sick and wounded. The true secret of the difference is, that they have some organization and a system: we pretend to neither one nor the other. From this want, in so many cases, of order and forethought our unfortunate troops have been exposed to those privations and sufferings which have reduced to nearly one-half its original numbers the finest army in the world.

At daybreak on the morning of the 19th the order was given to march. The French troops, long accustomed to a camp life, were the first to advance. Attached to them were about 7000 Turks. They rested on the sea, the British forming the left

wing, and thus taking the post of danger and honour; our flank was protected by the light cavalry.

The allied armies suffered severely during the day's march, although not a long one, from the heat of the sun and the want of water. The country over which they advanced was devoid of wood and thinly inhabited, from its nakedness resembling one of the poorest provinces of Turkey. There were no enclosures or villages to impede their progress. The few roads which traversed the steppe were mere beaten tracks—in winter almost impassable. The Bulganac, a sluggish muddy stream, winds beneath cliffs of earth, from the top of which a gentle slope, broken by a few ravines and irregularities of the soil, leads to the Alma.

The harvest had been scarcely got in, and ricks of fresh-cut corn and hay dotted a broad valley to the south of the Bulganac. Amongst them, as immoveable and scarcely to be distinguished from them in colour, were about one hundred horsemen. They were the advanced guard of a strong body of cavalry and artillery which were seen to issue from the village and gardens on the banks of the Alma, and to deploy on the open ground. Two batteries, of six guns each, their carriages and tumbrils painted light green, were supported by two regiments of cavalry and about 2000 Cossacks. As our skirmishers and light cavalry appeared on the crest of the hill, the enemy's videttes gradually retired, whilst their batteries rapidly advanced, covered and supported by the main body of the Cossacks and a regiment of dragoons. They formed and opened fire as the British light division came in sight. Their attack was soon returned with great effect by Captain Maude's troop of Horse Artillery.

The enemy, having merely intended to reconnoitre the advancing armies, retired. Apparently to cover their retreat, a second regiment of dragoons, distinguished by their white jackets and grey horses, advanced at full speed and formed with much skill on a knoll opposite the French right. Some guns having been turned upon them, they withdrew in disorder with as much precipitation as they had advanced. Their own artillery, mistaking them for French cavalry, opened upon them, killing and wounding seventeen of their number.

Not being pursued, the whole force fell back in good order, and crossing the Alma rejoined the Russian army. The country which they had occupied was again deserted; but on the hill-sides beyond the Alma there were dark moving masses of men, and the glittering of steel. The narrow stream had worn its bed through an undulating steppe, leaving an eminence between two and three hundred feet high. These precipitous cliffs opened about two miles from the sea into a spacious amphitheatre, intersected



sected by deep ravines and narrow ridges. Upon the eastern slope of this amphitheatre could be distinguished an earth-battery containing heavy artillery. This earthwork was separated by a narrow valley, or rather ravine, from a field-battery of twelve guns, placed in position somewhat higher up the slope. Behind the left (or Russian right) battery, and between it and the crest of the hill, were two dense squares of infantry; and this part of the position was covered or flanked by a battery of heavy guns, placed behind a breastwork on the heights, at the Russian extreme right. One or two white tents shone on the crest in the centre of the amphitheatre; and bodies of infantry, cavalry, and artillery were scattered over the slopes and on the summit of the ridges overhanging the Alma. Such was the position which was chosen by Prince Menschikoff to dispute the advance of the allied armies, and where he awaited with confidence their attack.

The allies bivouacked for the night on the rising ground to the south of the Bulganac. Their fires shone brightly on the hill-side, and seemed reflected back by the Russian lights on the opposite heights. The plan of attack was speedily agreed upon. One French division, under General Bosquet, accompanied by a part of the Turkish contingent, advancing along the sea-shore, was to force the heights, and to turn the enemy's left flank; the remainder of the French army, when this manœuvre had been successfully accomplished, was to attack that part of the Russian centre which rested on the high ground above the village of Almatomak. The English, retaining their inland position, were to wait beyond the village of Boulioук until the French had established themselves on the heights, and were then to turn the Russian right, avoiding as much as possible the fire of the centre batteries. The inshore squadrons of the two fleets, chiefly consisting of steamers, were to keep close to the coast, to cover the advance and attack of General Bosquet's division.

As the morning broke a thick haze covered the land, but was soon dispelled by a light breeze. No movement was perceptible in the Russian camp, and some believed that their strong position had been abandoned; but soon the sun shone upon the glittering bayonets and the green carriages of the artillery. The two dark squares again gradually formed behind the principal battery; cavalry and infantry gathered on the heights. In the plain, to the north of the Alma, a few Cossacks galloped to and fro, whilst others sat motionless on their horses, watching the movements of the allied forces.

At daybreak the Agamemnon, accompanied by a squadron of English and French steamers, moved majestically along the coast,

coast, and took up a position off the mouth of the Alma. Soon after, a column of infantry, preceded by skirmishers, descended from the hill above the Bulganac, and slowly advanced by the sea-side. This was General Bosquet's division, accompanied by the Ottoman troops. They were soon followed, more inland, by the main body of the French army, formed by the divisions of Prince Napoleon and of Generals Canrobert and Forey. The whole halted about a mile from the Alma. The British troops were not yet in motion. Unaccustomed to the bivouac, they required more time to leave their night's resting-place, and some hours were thus lost, which would have been invaluable to the allies at a later period of the day.

It was ten o'clock before the British columns, like bright patches of scarlet in the landscape, their bayonets all glittering in the morning sun, were seen pouring down the hill-side. They had formed into order of march; the light and second divisions in advance; the first and third in the centre; and the fourth, with the baggage and commissariat, in the rear. Between the divisions was the artillery; and the rifles in skirmishing order protected, with the light cavalry, the left flank and front. The English halted as they came into line with their allies; the second division soon after deploying into four squares, so as to meet the extreme left of the French. Both armies then moved forward in one united mass. The few Cossacks who had been stationed as videttes to the north of the Alma now fell back. A thick smoke, mingled with bright flames, rose from amidst the trees. The village of Boulioutk had been fired by the retreating horsemen. Again both armies halted and then formed into order of battle.

It was a moment of the deepest anxiety to those who gazed upon the scene. A terrible struggle, upon which depended the very fate of the allied armies, was about to take place. No one doubted British valour; but a task was there which human strength could scarcely accomplish. Most of those in the British ranks, who were shortly to meet in deadly strife an enemy superior in numbers, and holding a position that seemed almost impregnable, had never seen war before. The lofty cliffs, and the precipitous slopes, bristling with artillery, might well appear an inaccessible barrier, defying all attack. Here and there a pathway led up the ravines which had been furrowed by the winter rains. But what enemy would attempt to drag artillery up those narrow and precipitous tracks? The guns which swept the approaches far exceeded in size those of the allies. Their position had been carefully chosen, and their range was accurately fixed by marks known to the Russian gunners, who could thus



thus open their deadly volleys upon our advancing lines with unerring aim. Across a part of the slope itself was a trench of sufficient depth to protect the Russian marksmen, and to be an impediment to the assailants, whilst field-batteries occupied almost every eminence commanding the open ground, over which the attacking troops would have to advance. The banks of the river were steep, and were sufficiently wooded to afford shelter to riflemen, who, concealed in the village and in the vineyards, poured an unceasing fire into the front ranks of the allies. The wooden bridge across the Alma had been partly destroyed, but the stream was in most places fordable.

It was nearly one o'clock before General Bosquet could lead his column along the shore to open the attack. A few riflemen had attempted to occupy the heights immediately above the sea, but had been speedily dislodged by the fire of the French steamers. The river winds at the very foot of the cliffs. In the latter part of its course it is only fordable at its mouth, where a bank of sand forms a bar, upon which the water scarcely reaches to a man's middle, but over which on this day the sea broke in a foaming surf. Captain Peel, regardless of the enemy's marksmen on the heights above, had early in the morning placed a boat across this narrow ford, to facilitate the passage of the French troops.

On the plateau above the river, almost within range of the guns of the ships, awaiting the attack, was drawn up a strong body of cavalry, infantry, and artillery. Whilst his column was halting, awaiting the advance of the English, General Bosquet, at the head of his staff, had carefully reconnoitred the enemy's position, and had examined the nature of the ground which they occupied. When his division resumed its march, he detached from it a regiment of Zouaves, and a body of tirailleurs, who, concealed by the trees and bushes, reached unperceived the river, about a mile from its mouth. Suddenly they emerged from the brushwood on the opposite side of the stream, and were soon swarming like ants up the almost perpendicular face of the cliffs. With extraordinary activity and undaunted courage they struggled onwards, and gained the summit. The Cossacks, intently watching the movements of the division which threatened the Russian left, had not perceived this skilful manœuvre. Suddenly seeing the enemy in their rear, they turned their horses, and precipitately galloped back towards their centre; the infantry and artillery quickly followed. The Zouaves, as one by one they reached the plateau, fell into line, partly protected by an artificial tumulus which crowned this part of the heights. But the few who first succeeded in gaining the

the summit had scarcely time to collect and form before the Russians opened a deadly fire of musketry and artillery upon them. General Bosquet now hastened onwards the remainder of his division, and, crossing the mouth of the Alma, hurried to their support. The main body of the French, under Prince Napoleon and General Canrobert, at the same time rapidly advanced through the village of Almatomak, and, fording the river, gained a pathway which led up to the plateau. It was only by extraordinary exertions that the artillery, drawn by relays of horses, could be dragged up these precipitous tracks, now crowded with troops struggling forward in disorder to the attack. A battery belonging to General Bosquet's division was the first to gain the heights. Bravely led, it rapidly advanced to the assistance of the Zouaves, and sustained for some time, but with great loss, an unequal contest with two Russian batteries of heavier guns. At this moment the issue of the day depended upon the courage and steadiness of the Zouaves, and the few troops that had joined their diminished ranks. Had they given way, they would have been driven back upon the ascending columns, which would have been thrown into the most fatal disorder; but they nobly held their ground. General Bosquet, with admirable skill, forming into line such part of his division as had reached the heights broken by the confusion which had occurred in mounting by the narrow pathway, led them against the enemy. Some regiments of the line having attempted to force the Russian position to the left of the Zouaves were received as they emerged on the plateau by so hot a fire that they fell back, and for a moment sought protection beneath the edge of the cliff, whilst their skirmishers, concealing themselves behind the irregularities of the soil, and in the small ravines, poured a continuous volley into the enemy. The main body of the Russians was collected round an artificial tumulus, upon which stood a half-built octagon tower. Thus partly protected, they maintained their ground. To dislodge them, the Zouaves, who had now formed in considerable force, accompanied by some regiments of the line, charged with the bayonet. Lieutenant Poitevin and a serjeant of the Zouaves reached the unfinished building, and both, as they triumphantly raised the French flag upon it, fell covered with wounds. It is a curious characteristic of these brave but eccentric troops that the Zouave had a monkey upon his shoulder, which, dying, he bequeathed to his company, and which has since shared all their dangers. The Russians fiercely contested the vantage-ground; and here took place the deadliest struggle between the French and the enemy. Around and within the unfinished tower were heaped the dead and the dying;



dying; but the Russians at length gave way before repeated and impetuous charges, and again fell back.

Prince Menschikoff, seeing that his left was about to be turned, detached from his centre a considerable body of infantry and artillery to its support. The main body of the French army were now rapidly gaining the heights, and their heavy artillery had opened upon the enemy with great effect. A body of marines, under the brave Colonel du Chateau, boldly pushed up the declivity forming the western extremity of the amphitheatre, where the English and French lines came into contact. The Russians perceiving that the position was now carried, and fearing lest they should be outflanked, hastily withdrew the battery of heavy guns which we have described as commanding the western slopes of the amphitheatre, and which at the same time enfiladed the earthwork, subsequently so hotly contested with the British.

Nearly up to this time the British troops had remained immoveable. Partly concealed from the enemy by the smoke of the burning village and the trees on the river bank, they halted, as had been agreed, waiting until the French had gained the heights and had turned the Russian left. Marshal St. Arnaud, however, perceiving that fresh columns of infantry and batteries of heavy artillery were being brought against him, and fearing to be overpowered by a vast superiority of numbers, sent the most urgent requests to Lord Raglan to advance without further delay. 'We are massacred,' declared his aides-de-camp, in the somewhat exaggerated language peculiar to our allies. The moment appeared critical. Regardless of the overwhelming masses of artillery in front, and no longer adhering to the original plan, the British commander gave the order to move forward. Suddenly the batteries on the slope, which had hitherto remained silent, poured forth their deadly fire. The marksmen behind the walls and in the vineyards opened at the same time upon the approaching lines, but were soon driven over the river by our rifles. For a short time the British troops were lost in the smoke of the burning village; but suddenly their artillery responded to the enemy. Keeping up a well-directed fire, they inflicted considerable loss upon the Russians, and blew up a tumbril in the left battery on the slopes. Partly under cover of their fire, Lord Raglan, at the head of his staff, plunged into the ford, and amidst a shower of shot and shell gained untouched the opposite bank, near the extreme left of the French. The light division, the first to attack, had formed in line, but was soon broken by the irregular ground and the burning village through which it had to advance. More than once the men had to lie down to take-

take shelter for a moment from the heavy fire of the Russian batteries. They crossed the stream in disorder, and were not allowed to form under the shelter of the opposite bank; but led and urged on by Sir George Brown, the 7th, 23rd, and 33rd Regiments, General Codrington's brigade, rushed up the slope in the teeth of the heavy guns placed in the earthwork. With unparalleled courage they drove the enemy before them, and in spite of repeated volleys of grape, which mowed down their ranks, made their way to the cannon's mouth. Some actually leaped into the battery; but were soon compelled to desert it by the heavy fire of the Russian battalions which swept the slopes behind it. A column of the enemy descending the hill was mistaken for the French, and for a moment our troops ceased firing. It soon declared itself by opening a volley upon the remains of the three regiments, which wavered and fell back, mingling together in complete disorder. The Russians, encouraged by this success, sprang over the earthen parapet, and with the bayonet rushed down the declivity upon the retreating crowd. For an instant the issue of this terrible contest seemed doubtful. The brigade of Guards was advancing in support of the Light Division, and an order was now given to it to retreat. The second brigade of the Light Division was inadvertently formed into a square under the heavy fire. At this most critical moment Sir Colin Campbell, who had on more than one hard-fought field earned his experience and reputation as a commander, and to whom fame had already assigned the victorious issue of one great battle, urged the immediate advance of the Guards and of the brigade formed into square. The advice was fortunately followed, and the Guards again moved with steady step and irresistible courage up the steep ascent.

Sir Colin himself leading his gallant Highland brigade (the 42nd, 79th, and 93rd Regiments) next made that flank movement which decided this part of the battle. The bagpipes sent forth their shrill notes, and the long line moved on with the slow and measured step of an ordinary parade. The calm and determined fashion of their advance, and the strangeness of their costume, appear to have struck terror into the enemy. They reached, with comparatively small loss, the right flank of the redoubt, and at the same time the Guards advanced with equal determination up the slope. Volleys of grape and musketry were opened upon them, but they did not return the enemy's fire until within a hundred yards, when, after discharging their pieces with terrible effect, they rushed with the bayonet upon the redoubt. The Russians recoiled before the charge, and seeing the Highland brigade on their flank they hastily abandoned the earthwork, leaving, however, two



two guns as trophies in our hands. A short struggle took place, and the Guards remained the victors amidst a heap of slain.

Meanwhile the Second Division, gallantly led by their veteran general, Sir De Lacy Evans, had steadily advanced on the western side of the amphitheatre, notwithstanding the galling fire from the earthwork and flanking field-batteries. It reached the middle of the slope as the redoubt was carried; and one of its brigades, under General Pennefather, formed into line with the victorious Guards. With fresh ardour they again pressed forward. The two massive squares of Russian infantry still remained unshaken on the high ground above them, and seemed to present an immoveable barrier against our almost exhausted troops. Lord Raglan saw the impending danger, and by his orders two guns from Captain Turner's battery were speedily brought to a commanding ridge near which he stood. The shot ploughed through the dense ranks. They soon began to waver, and in a few moments more they were scattered far and wide over the hill side. The second mass soon followed, giving way before the advancing Highlanders, but retreating in better order. The Russian commanders made one more attempt to rally their flying troops, and a mounted officer was seen bravely leading back a heavy column to the charge. But it gave way before it reached the British line, now steadily ascending the slope, and was thrown back upon the retreating army.

The Russian reserves on the right made a last effort by suddenly moving on our flank to check the progress of the Highlanders and to dispute with them the crest of the hill; but in vain. A regiment faced to receive them, and a single steady and well-directed volley sent them back in disorder. The French had driven the enemy from every part of the heights to the right. A deep valley, running up far inland from the sea, prevented the Russian left retiring without making a considerable circuit and mingling with the centre, thus adding to the disorder. The French batteries opened relentlessly upon the flying masses. A scene of terrible confusion — a complete rout rather than a retreat — now ensued; the Russian soldiers throwing away their arms, their boots, their knapsacks, and all that might impede them, left their ranks and sought safety in flight; the British Horse Artillery followed, pouring into them, again and again as it came within range, its murderous fire. In vain the Russian cavalry, which had taken little or no part in the battle, attempted to check the pursuit: they could but cover the retreat of the panic-stricken crowd. But our artillery being unsupported was soon compelled to return, and about four o'clock the last gun re-echoed in the distance. In three hours — during two of which only

only the British had been engaged—the allied armies had carried, by their irresistible courage and daring, a position which might well have been deemed impregnable!

The enemy was permitted to retire unmolested, although the 3rd and 4th divisions of the British army, drawn up during the action as a reserve on the right bank of the Alma, had not been under fire, and the 4th division, and two brigades of the French, with the whole of the Turkish contingent, had taken no part in the battle. The reasons assigned for not continuing the pursuit were, the want of cavalry—a want undoubtedly much felt,—the exhausted state of the men—which could only apply to those who had been engaged,—and the late hour of the day—to be attributed to the delay which had unfortunately taken place in our movements in the morning. Some of the most distinguished officers in both armies were, it is understood, in favour of an immediate pursuit, and it is the more to be regretted that their advice was not adopted, as such was the panic in the Russian army, that on the night after the battle, a false alarm having been spread that we were advancing, they precipitately fled from the Katsha, where they had bivouacked, leaving their guns behind them. Their dread did not cease until they were within the walls of Sebastopol. Even on the Belbec ammunition-waggons were found abandoned on the road. It is impossible to say what might have been the result if the allies had followed up their success—perhaps the total destruction of the Russian army and the capture of the stronghold which now defies us.

The loss of the Russians is believed to have been little less than 8000 men, whilst amongst nearly 900 prisoners were 2 generals of brigade; that of the allies amounted to 619 killed and 2840 wounded. The British lost 362 killed and 1640 wounded. Attacking the centre of a position of great strength, and led up in front of a redoubt armed with artillery of a calibre rarely seen in the field, they suffered far more than their allies. It was in advance of and within this earthwork, that the fiercest struggle of the day, which was marked by deeds of heroic valour, took place; it was before it that three British regiments were nearly destroyed; and it was above and below it that there lay a heap of dead and wounded—a mingled mass of English and Russians—which perhaps had never been beheld by the oldest warrior within so small a space. The whole Russian force engaged appears, according to the statement of one of their generals, to have amounted to 33,000 infantry, 5000 cavalry, about 2000 marines, and 100 guns; the allied armies numbered about 50,000 men, though less than 30,000 took part in the battle.

The distant sounds of artillery had scarcely ceased before the French



French began to care for and remove their wounded; ere night fell none remained on the field. They were taken away on seats and beds slung upon the backs of mules, or, when too severely injured to bear the motion, upon litters carried by men. Officers of all grades aided in the discharge of this sacred duty; nor did General Canrobert, although himself wounded, neglect it. The priests attached to the army ministered to the dying. It is too well known how the English wounded fared on that night. There were but scanty means of moving them from the place where they had fallen. For the most part they remained on the field exposed to the heavy dew and the cold air, with such slight covering and food as a charitable hand might bestow. Some there were who passed two long nights in agony on the cold ground. From one small group of English and Russians, a serjeant, whose leg was broken, dragged himself to the river's edge to fetch water for his suffering companions. Those who were thus left helpless had still to fear another enemy—the maraunders who after nightfall prowled amidst the dead, and who, for the sake of plunder, rarely spared the living. The bandsmen, it is true, were employed to carry the wounded to huts which had been assigned to them in the village, but their numbers were totally inadequate to the services required. It was, moreover, disgraceful that the soldier should depend upon such means alone, for his comfort and even life after he had nobly shed his blood for his country. May not the larger number of deaths in the British army, as compared to that in the French, be partly attributed to this neglect?

Thus British and French troops had been brought face to face with those of Russia. The battle of the Alma first taught us the inferiority of the enemy's infantry and cavalry, and the efficiency of his artillery—a result which all subsequent experience has tended to confirm. A Russian general, who was taken prisoner, attributed the loss of the day chiefly to the misconduct of the cavalry, and on no future occasion has this arm retrieved its character. The infantry could not stand against the determined valour and steady advance of the English troops, nor the impetuous charges of the French, and when once broken it could no longer be rallied. The Russian regiments engaged differed much in their appearance and conduct. Those recently brought from the Principalities, which they had only quitted in the middle of the previous month, and from the centre of Russia, were large and ablebodied men; whilst those from the Crimea and Circassia were wretched in appearance—ill fed and ill clothed. The artillery was admirably served and fired with rapidity and precision, but the gunners drove off their guns too quickly—an error

which

which they have committed throughout the campaign, and which may be attributed to their knowledge of the great importance attached by the Emperor to the loss of a gun. The Russian infantry only fight with confidence when under cover of a powerful body of artillery.

The position of the Russians, very strong by nature, was but ill defended. Placing too much confidence upon the precipitous nature of the ground, and not as yet aware of the daring and activity of the African troops of our allies, Prince Menschikoff had not sufficiently protected his left flank. It was mainly owing to this neglect that his position was so soon forced, and that his centre, threatened by the unexpected appearance of the French in their rear, abandoned their batteries and retired to the crest of the hill. The advance of the British troops up the slope in the teeth of the heavily armed battery, which swept it on all sides, has been much criticised. The leading up of the brigade of the light division, before it was formed, was undoubtedly a grave error, which entailed a severe loss upon three regiments. The attempt to storm this strong redoubt at all must be attributed to the urgent messages of the French Commander-in-Chief, whose known character for exaggeration might have justified some hesitation before the original plan of attack was completely abandoned. The undaunted courage and steadiness with which the British troops performed their perilous duty was the admiration of the French, and fully established that reputation amongst their allies, which every subsequent engagement has only tended to confirm. No troops in the world could have behaved with a more noble devotion. It has been well remarked that at the Alma each army had fortunately assigned to it that share in the battle which best suited its peculiar qualities. Whilst British calmness, endurance, and courage were eminently displayed in the attack upon the Russian centre, the activity, intelligence, and valour of our allies were no less conspicuous in the ascent of the almost perpendicular cliffs in the face of an enemy, and in the undaunted spirit with which they formed into line, one by one on the heights, under a heavy fire—the Zouaves well nigh deserving the eulogium passed upon them by the French Commander-in-Chief, 'that they were the first soldiers in the world.' *

The

* As considerable misapprehension appears to prevail as to what the Zouaves really are, we may observe that these regiments originally consisted of Arab natives of Algeria, and were so called after an Arab tribe. They were afterwards disbanded and reconstituted; only Frenchmen, with a very few exceptions, being admitted into their ranks. Native regiments were then formed under the name of 'Indigènes,' or 'Turcos.' The Zouaves are notorious for their activity and courage, and at the same time for their propensity to plunder—a habit easily contracted



The allied armies were detained for two days on the Alma after the battle. Marshal St. Arnaud proposed to advance on the 22nd; but the British dead were still unburied, and the wounded as yet not moved to the ships. It was only late on the second day that they had all been brought to the seashore, through the unparalleled exertion of the officers and seamen of the inshore squadron. By suspending a hammock to an oar, four men could carry, though not without much fatigue, a wounded soldier to the boats ready to receive him on the beach. The French, too, lent us their mules, and gave us that hearty and generous assistance which they have ever been ready to afford. Many disabled Russians were also placed on board ship; but about 700 were left behind, for the time, under the charge of Dr. Thomson, whose heroic conduct has secured to his memory a well-deserved fame.

On the 23rd the allied armies commenced their onward march. Disease had unfortunately again shown itself in the British ranks. The cholera had broken out afresh, much aggravated, it is believed, by the 4th division having been allowed to bivouack upon the ground which Russian troops had just left, and which was covered with decayed and offensive matter, besides teeming with loathsome vermin. There is no officer more needed in our army than one, either a military or a medical man, whose special business it should be to see to the sanitary condition of the camp. Owing to the want of the commonest precautions, and of some one person to look to such matters, offal, dead horses, and every kind of noisome matter are permitted to accumulate close to our tents. The air becomes tainted, and disease soon spreads through the camp.

Lord Raglan desired to march in one day to the Belbec; but Marshal St. Arnaud now objected. The armies, therefore, halted on the Katsha, and on the following day (the 24th) encamped on the left bank of the Belbec.

The original intention of the commanders of the allied armies had been to invest and attack the forts which protect Sebastopol on the north. The town, with its arsenal, its dockyards, and its storehouses, stands on the southern side of a deep inlet, whilst on the opposite side are only the large stone forts and batteries which defend the entrance and interior of the harbour. These massive edifices are erected upon the water's

contracted in an African campaign. They chiefly consist of men who, having served their prescribed five years in the army, have no desire to leave it, but prefer the perils and excitement of a military life, and of various other adventurous spirits who love war better than peace. It requires the strictest discipline to keep them under control, and to place some check upon their natural propensities. They wear a loose Oriental dress, with fez and turban, both becoming and convenient.

edge.

edge. Behind them the ground rises into a ridge of no great height, but commanding the inlet and town on one side and descending on the other in a long gentle slope to the Belbec. The coast to the north of Fort Constantine, which is at the very mouth of the harbour, consists of a cliff of earth, about 100 feet high. On the summit of this ridge the Russians had recently constructed a considerable fort, known to our engineers as the Star Fort, or Severnaia, which, from its position, commands both the town and the Belbec. On the cliff, not far to the north of Fort Constantine, is the Telegraph Battery; beyond it, in a line with the Star Fort, and connected with it by covered ways and embankments, is a square stone tower, surrounded by earthworks, and mounting eight heavy guns *en barbette*, that is, placed on the summit without embrasures, and working on pivots, so as to be turned in every direction upon an enemy. On account of its mischievous qualities, it has been named 'the Wasp Battery' by the seamen of the fleet. From the weight of metal thrown by its guns, their long range, and their plunging fire, it has caused more injury to our vessels, and has more embarrassed their movements, than any other battery erected by the enemy. Such, with one or two unfinished earthworks in front of the Star Fort, were the defences on the northern side of Sebastopol when the allied armies crossed the Belbec. Since that time other works, chiefly earth-batteries, have been erected on the sea face, on the slope between the Belbec and the Star Fort, between that fort and the harbour, and to the east of it nearly as far as the Inkermann Valley.

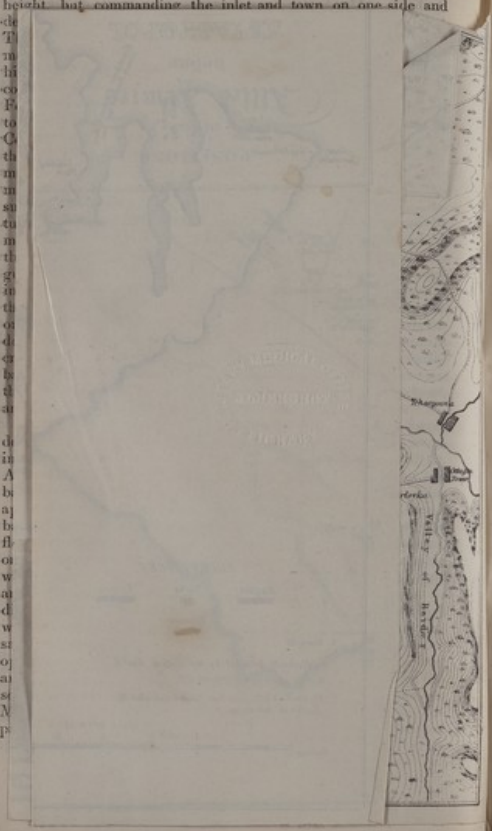
It was on the Belbec that the commanders of the allied forces determined upon the now celebrated flank march. The reasons in its favour appear to have been the following:—Marshal St. Arnaud declared that his troops could not encamp on the left bank of the Belbec so as to be in a position to open regular approaches, without being exposed to the fire of the Russian batteries which commanded the river. For similar reasons the fleet would have had to remain off the Katsha, and to disembark on an exposed coast the stores and siege train. Unfavourable weather might at any time prevent communication with the ships, and the distance was too considerable between the point of disembarkation and the lines of the besieging army—the road, which we had no available force whatever to protect, being at the same time exposed to the attack of an army in our rear. On the opposite side of Sebastopol comparatively safe harbours and anchorage were to be found, in the deep inlet of Balaklava on the southern coast, and in those bays which indent Cape Chersonese. Moreover, it was anticipated that the Russians would be unprepared to receive an enemy in that quarter, and that it would be possible



sible to take the town at once by a *coup de main*. At the same time, should an immediate assault be deemed unadvisable, the nature

POSITIONS
of the
Allied Armies
before
SEVASTOPOL.
SEVASTOPOL
Cemetery
BATTLE OF INKERMAN
English
Attack
French Attack
Russian Reserve
Lord Raglan's Head Quarters
Balaklava
Kadikoi
Kamara
Traktir
Mackenzie's Farm
Woronzoff Road
Cape Chersonese
Lighthouse
Landing Place
Round Tower
Quarantine Bay
Careening Bay
Victoria Ravine
Inkerman
Sandbag Battery
Barrack Battery
Genoese Battery
Flagstaff Battery
Garden Battery
Chapel
Telegraph
Spring
Ravine
Fort Constantine
Fort Alexander
Fort Nicholas
Fort St Paul
Fort St Peter
Fort St Catherine
Fort Quarantine
Fort Michael
Fort Paul
Fort Peter
Fort Catherine
Fort Alexander
Redoubt
Redoubts
Russian Corps d'Armee engaged 5th Nov.
Russian Corps d'Armee engaged 26th Oct.
Reserve
Light Division
Guards
Highlanders
Cavalry
Artillery
Infantry
Turkish Redoubts
British Redoubts
Lord Raglan's Head Quarters
Woronzoff Road
Road to Balaklava
Road to Kamara
Road to Traktir
Road to Mackenzie's Farm
Road to Inkerman
Road to Sevastopol
Road to Woronzoff
Road to Victoria
Road to Cape Chersonese
Road to Quarantine Bay
Road to Careening Bay
Road to Victoria Ravine

edge. Behind them the ground rises into a ridge of no great height, but commanding the inlet and town on one side and





sible to take the town at once by a *coup de main*. At the same time, should an immediate assault be deemed unadvisable, the nature of the country was such as to afford the allies a secure position easily defended against a flank attack. On the other hand, arguments were not wanting in favour of commencing the siege on the northern side. With the co-operation of the fleet, the Star Fort, the only really formidable obstacle, would have been speedily taken by regular approaches; and, when once in our hands, would enable us to command the town and defences on the opposite side of the harbour, whilst we could have interrupted the approach of convoys and reinforcements by the high road from Odessa. The objections to the southern side were that no check whatever could there be placed on the relief and provisioning of the place, and that, even presuming the town and its defences to have fallen into our possession, we were still commanded by the ships of the fleet, the Star Fort, and any batteries erected on the northern side. The reason, we believe, which finally determined the flank march was that insisted upon by Marshal St. Arnaud—the inability of his army from its exposed position to undertake the siege.

The truth is that we had not sufficient troops to render either plan feasible. We could not carry on the siege of the Star Fort and at the same time protect our rear against the reinforcements which were then rapidly approaching; nor had we men enough to engage in a regular siege of a town which we could not even invest. Only one thing could justify our landing without a reserve and sufficient means for besieging a great fortress—the possibility of taking Sebastopol by surprise. That opportunity once lost, we were in a terrible dilemma. We had attempted the siege of a stronghold of enormous strength and inexhaustible resources with an army scarcely supplied with the materials necessary for a siege of any duration, immensely inferior to the forces which could be collected on its flank, utterly incapable not only of investing the place, but even of throwing the slightest obstacle in the way of communication between the besieged and the open country, and without any reserve to supply inevitable losses by battle and disease. The sequel will show the penalty we have paid for thus blindly entering upon so vast an undertaking and without sufficient appreciation of the difficulties we should have to encounter.*

It may be observed that this sudden change of the base of our

* Since these remarks were written we find that Sir Howard Douglas, in the Appendix to the new edition of his valuable work on Naval Gunnery, has taken the same view as ourselves. His high authority upon all such matters gives great weight to his comments upon the expedition to the Crimea.

operations could only have been effected whilst a steam fleet was off the coast, and could re-open its communications with the army as soon as it had appeared on the opposite side of Sebastopol. This daring measure has demonstrated one of the many immense advantages which steam confers upon an invading force.

The flank march having been resolved upon was executed with considerable skill, and with that determined spirit which is so characteristic of British troops. It was a bold and hazardous undertaking. The country was difficult and unknown. Thick woods, deep ravines, and precipitous hills, only crossed by mountain tracks, were to be traversed by the army. Had the enemy learnt our intentions, we might have been exposed to the most fatal disaster. As is well known, our advanced guard fell in with the rear of a strong Russian force which was panic-stricken by the unexpected encounter. Had our cavalry been present, a complete rout must have ensued. But we were no less surprised than the enemy. It was Lord Raglan with his staff who, emerging from a thick wood, first found that he was close to a battery of Russian guns. Fortunately Captain Maude was there with his troop of horse-artillery. A few rounds drove the protecting escort from the baggage, which became the spoil of our soldiers. A general officer—perhaps Prince Menschikoff himself—was observed to threaten from the windows of his carriage with personal violence his coachman, who vainly urged his horses through the flying crowd. The narrow road was so encumbered with carts, tumbrils, men, and animals, that had an active trooper made a dash at the foremost waggon and cut the traces of the horses, a large number of guns would inevitably have fallen into our hands.

We had fallen in with the rear of Prince Menschikoff's army, which, after the battle of the Alma, had retired to the south of Sebastopol, and had probably occupied the valley of the Tchernaia and part of the heights now held by our troops. The Prince was withdrawing to Simpheropol, and the explanation he has since given of his object, at that time misunderstood, is undoubtedly the true one. From the very beginning he appears to have overrated the forces of the allies. He believed, as was natural enough, that we should besiege Star Fort, and that we were in sufficient strength to interrupt the reinforcements and supplies which he was daily expecting from the north. He reckoned upon reaching Simpheropol, as we had reckoned upon reaching Balaklava, unperceived, and from thence, when sufficiently strengthened, threatening our rear and compelling us to raise the siege. The plan was neither ill-devised nor ill-executed.



executed. Our movement, as it has proved, was more successful, and has probably saved our army from utter destruction.

Early on the morning of the 26th of September the British army defiled across the valley of the Tchernaia and arrived at the entrance of that of Balaklava. Sir Edmund Lyons, apprised of its arrival on the banks of that river, had left his anchorage off the Katsha, and, followed by a portion of the in-shore squadron and by a few transports containing the siege-train and necessary provisions for the troops, had brought the Agamemnon to the southern coast. The land, which ends at Cape Chersonese in a long low spit, rises rapidly to the south into bold and precipitous rocks, whose summits are covered with wood. A narrow rift leads into the harbour of Balaklava. Overhanging the sea are the ruined walls and towers of an ancient Genoese castle. The harbour itself, somewhat difficult of access for large vessels, owing to an abrupt turn at the entrance, resembles a deep mountain loch. It is surrounded by high and rugged hills. Upon their very foot on the eastern side of this singular inlet stands the town, inhabited by Greeks, the descendants of a colony of comparatively recent date, which enjoys, with several similar communities in the Crimea, peculiar privileges under the Russian government. As the Agamemnon appeared before the mouth of the harbour a crowd of men, women, and children were seen flying over the hills. The garrison, consisting of a small body of Greek troops, natives of the place, took refuge in the ruins, and with four small mortars and a few wall-pieces prepared to make a vigorous defence. As Lord Raglan and his staff appeared at the entrance of the small valley leading to the town, a warm fire was opened upon him. But a party of rifles and a troop of horse-artillery having reached the ridge of a hill commanding the ruins, and the Agamemnon having fired a few shots, the enemy was soon induced to show a flag of surrender. The town was then occupied by our troops.

During the march from the Balbec, Marshal St. Arnaud, overcome by illness, and by long and acute suffering, resigned the command of the French army to General Canrobert, and died a few days after, on his passage to Constantinople. His loss was not much felt by the allied armies. Possessing many rare and remarkable military qualities, it is doubtful whether he was fit to command a large army, or to carry on a campaign against a powerful European enemy. His courage, energy, and indomitable will were the sources of his rapid rise, and bore him through his extraordinary career. They were eminently displayed during the short period of his command in the Crimea. When struggling with death itself he braved, with equal fortitude

in the council and in the field, the most terrible tortures; but he was deficient in the still higher qualities of a great commander; and whilst his vanity gave him confidence in himself, he never inspired it in others. He died in time to leave untouched a reputation chiefly founded upon an act of singular daring, for the successful execution of which he was, perhaps, above all other men peculiarly qualified.

A new, and to a certain extent a sure, base of operations had been secured for the allied armies. During the following day the French and English battalions took up their positions on the heights above Sebastopol, and in the valley to the north of Balaklava. Had the French still kept their original station on our right, they would, now that we had faced round, have been inland; but as General Canrobert was desirous that his troops should rest on the sea, the English still maintained the place of danger and of honour. As the harbour of Balaklava was too small for the disembarkation of the supplies and siege-train for the two armies, the French chose for that purpose Kamish Bay, a deep inlet in Cape Chersonese, more spacious and convenient than that of Balaklava, but completely exposed to northerly winds. A heavy sea setting into it would cause great damage to the shipping collected there.

Early on the morning of the 27th, Sir Edmund Lyons, amidst the enthusiastic cheers of those who had assembled to welcome one whose presence at all times inspired confidence and hope, brought the Agamemnon with admirable skill through the narrow entrance, and round the abrupt turn, into the harbour. She was followed during the day by several transports and vessels of war.

No time was lost before ascending the heights and reconnoitring Sebastopol. It was found that scarcely any preparations whatever had been made on the south side to receive an enemy. One round tower of stone, of moderate dimensions, armed with heavy guns *en barbette*, flanked the approach of the town, from the end of the harbour to the dockyard creek. A second swept the country from this creek to the sea. On the shore was the Quarantine Fort, and a wall partly protected the town to the west. With these exceptions there were on the land side neither wall, ditch, battery, nor other defence. So completely had the inhabitants of the place been taken by surprise that they had scarcely time to escape by a precipitate flight from their country-houses. The town was already filled with the inhabitants of the surrounding villages, who had been driven in by the Russian troops.

On the appearance of the allied armies on the heights a panic prevailed



prevailed in Sebastopol. Steamers and boats of every description were seen coming to and fro in the harbour; long lines of carts, carriages, ladies on horseback, and a crowd of persons on foot, were observed hurrying along the road leading into the interior. Property of every kind appears to have been removed from the town. Almost every deserter and prisoner who has since fallen into our hands declares that, had the allies at once entered the place, little or no defence would have been attempted, and that the inhabitants were utterly at a loss to account for our inaction. Sir John Burgoyne, it is believed, was of opinion that the place should be summoned to surrender, and that, in case of refusal, we should be justified in at once proceeding to the assault. Several of the ablest and most experienced officers in the British army (amongst whom may be mentioned the late Sir George Cathcart) and, we understand, in the French army also, thought that a *coup-de-main* would be successful, and would be attended by comparatively small loss. The reasons assigned against this summary proceeding were, that it was inconsistent with humanity thus to treat a town which was filled with women and children; that to assault a place which would fall by a regular siege could never be justified in case the attempt should end in a reverse or a disaster; and that if we even took possession of the southern part of the town, we could not hold it for any length of time, under the guns from the opposite forts, and from the ships. Such reasons appear to us, we confess, to be inconsistent with the state, resources, and numbers of the allied armies, and with the time and mode in which we had entered upon this campaign. Had they been valid, it was more than mere error and want of foresight to throw an army into the Crimea without a reserve or the means of carrying on a protracted siege; for it was only the possibility of taking the place by a *coup-de-main*, as we have already observed, which could justify the expedition.

It was not until the 5th October, ten days after the forced march, that Captain Staunton, of the Engineers, was sent to examine the ground, with a view to making a line of defences on the side of Balaklava, and in two days more the earthworks were commenced. The enemy first appeared in force on our flank on the 7th October, and did not then persevere in the attack. A body of infantry, cavalry, and artillery, on that day crossed the Tchernaia, and appeared in the valley to the north of Balaklava. About 1500 Cossacks advanced beyond the rest of the detachment, and approached our lines. It is believed that they might have been completely cut off, had our light cavalry been well directed. At least a general impression to that effect prevailed

prevailed in the English army, and caused that feeling to which may partly be attributed the fatal charge of the light brigade on the 25th. Maude's troop of horse-artillery again distinguished itself on this occasion. The enemy having suffered some loss, but having captured three of our dragoons, retired in confusion, many Russians throwing away their arms and accoutrements to facilitate their flight. It was only on the 12th October that the first works intended for the defence of Balaklava were completed. Sir Colin Campbell having been named to the command of this important position, encamped at the entrance to the small valley with the 93rd Highlanders. About 3000 Turkish troops, chiefly Tunisians, who had newly arrived, were added to this small force. Some were placed in the redoubts; and the heights above the harbour were confided to about 1500 marines and sailors.

The French, with their usual forethought and energy, had on their arrival at once commenced throwing up redoubts and earthworks along the heights, extending from the Woronzoff road to the rear of their position. The upper part of that road, near the Telegraph Station, was commanded by a strong redoubt. Below it a considerable earthwork, armed with field-pieces, swept the sides of the hill and the valley beneath. Three large redoubts commanded the road from Balaklava to the camp and the rear of the French lines. These defences were entrusted to the 'corps d'observation,' under General Bosquet, consisting of regiments of the line, Zouaves, Indigènes, and a considerable body of Turks. Between the Woronzoff road and the edge of the hills overlooking the end of the harbour, the heights were held by the first and second divisions of British troops, and no steps were taken to protect them from a sudden attack of the enemy.

By a reference to the accompanying plan* it will be perceived that the allies are in possession of a high plateau, the eastern sides of which, from the end of the harbour of Sebastopol to the sea, rise abruptly, almost precipitously, from the valley. To the north it slopes gradually to Sebastopol, the hill-side being cut up into deep ravines, which run far inland and divide the heights into several distinct parts. It must be borne in mind that the camps of all the divisions, except a part of the 4th, are concealed from the town by high ground in front of them. To the west the plateau subsides rapidly into the low land which forms Cape Chersonese. Whilst the English batteries command Sebastopol,

* This plan has been reduced from one surveyed and engraved by the French Government, and gives with accuracy the position of the allied armies, and the nature of the surrounding country; those hitherto published in England are very incorrect.

and



and are at a very considerable elevation above it, those of the French are for the most part on a level with the Russian works. It is evident that had we the heights alone to defend, our position, if properly protected, would be one of extraordinary strength—indeed impregnable. Their sides towards the valley of the Tchernaia are so precipitous, in some places forming cliffs, that no enemy could force them in the face of British and French troops. The roads which lead up to them could, without difficulty, be rendered impassable. Unfortunately the necessity of holding the harbour of Balaklava compelled the allies to leave the heights, to descend into the plain, and to extend their line so as to command all the points of attack upon that important position. The first line of defence was traced upon a low ridge, or undulation, which divides the valley in front of Balaklava into two distinct parts, leaving the foot of the cliffs, near the point where the road from the town leads up to the heights, and joining the wooded mountains beneath the village of Kamara. Four isolated redoubts were built upon this ridge. About a mile in their rear were the Highlanders, and to the right of and behind this regiment the Turks. On the hills above Balaklava were a few scattered earthworks, held by the marines and sailors. This line of defence, it is evident, was far too extensive to be adequately defended by the few troops which could be spared from the siege, and thus offered a weak point exposed to the attack of the enemy. We may observe that no attempt whatever had been made to interrupt the communication between the open country and the town, by the Tchernaia or Inkermann valley, although the road might have been completely commanded by a battery on the overhanging heights.

On the 7th October a council of war was held at the headquarters of the British army, to determine upon the nature of the operations to be undertaken against the place. Up to this time nothing had been done, except that by the unceasing exertions of the officers and seamen of the squadron, under the command of Sir E. Lyons, the greater part of the siege train had been disembarked, and was ready to be placed in battery. At this council of war Sir John Burgoyne is understood to have submitted a plan of attack, which was summarily rejected by all the generals present as utterly impracticable. The army, therefore, still remained without any precise scheme of operations. It was subsequently resolved that the French should undertake the real attack on the extreme left, between the sea and Dock-yard Creek, whilst our batteries should be erected at a sufficient distance to keep down the fire of the enemy, without any intention of advancing them, for the present, nearer to the town. This determination was chiefly

owing

owing to the nature of the ground respectively held by the two armies. The space in front of the French lines permitted the usual process of sapping and trenching to be carried on, while the position occupied by the British was too rocky to admit easily of such works, and was broken by so many ravines that regular approaches were almost impossible. This decision having been come to, the command was given for breaking ground, and directions were issued in general orders for the conduct of the troops to be employed in digging and defending the trenches.

Notwithstanding the result of the council of war, our works proceeded but slowly, and were interrupted for twenty-four hours, the engineers not having been able to find by night the battery they had traced by day. But could it be otherwise? Our engineers had no detailed plan of our projected and finished works and those of the enemy. In these matters we afford a striking contrast to our allies. Their admirably organised department of engineers had constructed a map, upon a large scale, of the ground and the siege operations. In this map were daily noted all additions made to the works, and the observations of officers constantly occupied in examining our position, the town, and the Russian defences. Almost every building of note in Sebastopol had received its name, arbitrary of course, but of considerable importance in transmitting orders to those employed at the attack. Each officer in command of troops was furnished with a tracing of that part of the map which included the trenches in which he was posted. He could not then lose his way and fall into the enemy's hands, an accident which more than once happened to our working parties.

By the time the English batteries were completed, exactly three weeks had elapsed since the allied armies had taken possession of the heights. There were four distinct works. That to the extreme left of the British position contained forty-six guns and mortars, and was generally known as 'the left attack,' or 'Chapman's battery,' from the engineer who superintended its construction. It was partly held by the Royal Artillery and partly by seamen, under Captain Lushington, of the Albion, who worked the guns taken out of the men-of-war. To the east of it, and nearly in the same line, was a second, known as 'the right attack,' or 'Gordon's battery,' mounting twenty-one guns, worked by the Royal Artillery under Colonel Dickson, and by seamen chiefly from the Diamond frigate, under Captain Peel. Beyond and facing the round tower was 'the five-gun battery,' containing a Lancaster gun and four heavy 68-pounders, taken from the Terrible, and worked by seamen. None of these batteries were nearer than 1300 yards to the Russian lines, the average distance



distance being about 1500. The fourth battery held one Lancaster gun, and was placed in an isolated position behind Gordon's battery, at above 2000 yards from the nearest works of the enemy. Such were the number of our batteries and guns on the 16th October. At a subsequent period the two Lancasters and the four 68-pounders having been withdrawn from their original positions, were added to the right and left attacks, and additional works were constructed. The French, we believe, had at first fewer guns in position, but their works were nearer than ours to the Russian lines.

In the meanwhile the Russians had been making unparalleled exertions to redeem the error they had committed in neglecting to defend the southern part of the town. Men, women, and children were observed working in crowds night and day, bearing earth, gabions, and fascines. The round tower at the extreme left was speedily surrounded by substantial earthworks, the tower itself, originally white, having been painted of the colour of the earth to render it a less conspicuous object. To the right of, and connected with it by a line of works, was constructed a formidable redoubt of considerable size, known as 'the redan.' Between the 'redan' and the arsenal, at the head of Dockyard Creek, were the 'barrack batteries,' so named from some large buildings behind them. To the west of the creek, facing the French lines, was 'the garden battery,' thus called from its position near a summer-house. Subsequently other batteries were raised between it and the creek. Beyond it was 'the flagstaff battery' (*batterie du mât*), united by a line of strong defences and by a wall to the Quarantine Fort and the sea. All these works had been commenced since the allied armies had encamped upon the heights. Every day fresh earthworks were thrown up and additional guns of heavy calibre placed in position. Whilst thus engaged, the enemy continually threw shot and shell into our camp, part of which was within range, and subsequently at our working parties. But in comparison with the number of rounds fired, estimated at no less than 25,000 before our batteries opened, the allies suffered but an insignificant loss.

As yet we had permitted the enemy to labour at their defences without interruption or molestation. When the extensive and solid nature of the new works was pointed out to the chief British engineer, he is said to have replied, 'that they were only built to be knocked down again.' But there were not wanting those who believed that works of earth would prove more formidable than those of stone, and who shook their heads as

as they saw fresh batteries, bristling with heavy guns, rising from day to day before them.

The long-wished for orders for the attack were at length given. The French and English batteries were to open their fire together at half past six o'clock on the morning of the 17th October, the signal being three rockets thrown up from the French lines. At a council of war it had been agreed that the allied fleets should make a simultaneous attack. To insure the co-operation of the British fleet, Colonel Steele, the military secretary of Lord Raglan, was sent to Admiral Dundas to apprise him of the decision of the Commander-in-Chief.

During the night of the 16th, the embrasures of the batteries, which had been previously concealed, were uncovered. In the uncertain light of dawn, the Russians already saw by this sign that the struggle was about to begin. They did not await it, but at once opened a terrible fire. No response was made to the challenge. A solemn stillness reigned through the lines of the allies. Thousands looked with throbbing hearts for the appointed signal. As the sun rose in the cloudless sky, three white streaks were seen above the French camp. Suddenly one long line of white smoke burst from the hill side, which, hitherto silent, now re-echoed the roar of artillery. Not a breath stirred the air, and a dense cloud soon hid the town and harbour of Sebastopol. As the light morning breeze arose and drew aside the curtain, every eye was turned towards the stronghold, to seek the effect of our long-expected attack. Of the heavy guns on the round tower, some were upturned—all were silent. The stone-work was rent, and deep fissures showed that the edifice could no longer bear the concussion produced by the discharge of heavy ordnance. But the earth-works which we had treated so lightly still poured forth their deadly fire. As the shot from our well-directed guns ploughed through them, clouds of dust rose into the air, and for a moment concealed the embrasures. Then again the white smoke issued from them, and proved that their efficiency was not materially impaired. A gun may have been upset or destroyed, but it was soon remounted or replaced, and the fire opened upon us as before. The contest was thus continued until about nine o'clock, when a report like that of distant thunder rose above the roar of artillery. A thick, murky column ascended from the French batteries, spreading far and wide as it rose into the air. A powder-magazine had exploded, destroying and disabling men and guns. The fire of our allies now almost ceased; a solitary flash at distant intervals only proved the extent of the disaster.

Soon



Soon after this explosion the French ships of war, with their yards dipped, were seen advancing in order of battle. Taking up their position to the south and partly in front of the mouth of the harbour, they opened their fire upon the forts and batteries facing the sea. But the British fleet was still far away, and the French had been nearly two hours in action before it engaged with the enemy. The Agamemnon at length moved majestically onwards, preceded by a small steamer, which showed in comparison as a mere speck upon the water. This vessel, used for towing, was commanded by a young mate of the name of Ball. He sought, as his brave commander had forewarned him, an honourable death, or that promotion for services in battle which is the highest ambition of the British seaman. Undismayed and calm, amidst a storm of shot and shell, he threw his sounding-line beneath the huge batteries, and showed the way to the Agamemnon following in his wake. A shoal stretching from the point on which Fort Constantine is built left the line-of-battle-ship only 2 feet beneath her keel, although still 800 yards from the enemy. Then was proved the wisdom of that resolute act—not unworthy to be classed with the burning of Moscow—the sinking of a great part of the fleet in the mouth of the harbour. Had the passage been open, the Agamemnon, in defiance of the triple batteries which guarded it, would have entered, and the issue of the day might have been different. The practicability and probable result of such an attempt were proved by the desperate step taken by the enemy. Close behind the Agamemnon was the Sanspareil, screw line-of-battle-ship (Capt. Dacres), and with her were the Albion, the London, and the Arethusa 50-gun frigate, each sailing-vessel being brought into action by a steamer lashed to her side.

As the Agamemnon drew near to take up her position, five batteries opened their broadsides upon her. The iron shower rattled through her masts and spars, and aloft she was soon a perfect wreck. But as her admiral had foreseen, the guns of the fort could not be concentrated upon her hull; she was too near to them, and the embrasures were too deep; she, therefore, suffered comparatively little, although exposed to this unequal contest. It was when thus engaged that her Flag-Lieut. Coles, the nephew of Sir Edmund Lyons, went to the Bellerophon in a small open boat, and brought this vessel to the assistance of the Agamemnon—an act of devotion and courage rarely exceeded.

The Rodney (Captain Graham), also coming in to support the Agamemnon and the Sanspareil, grounded under a terrific fire. Fortunately she was soon relieved from her critical position.

The

The Albion and Arethusa suffered more from the heavy metal and plunging shot of the Wasp Fort than even from the batteries of Fort Constantine. The first was taken out of action in a sinking state; and the other, having been more than once on fire, was compelled to withdraw.

But these gallant vessels unsupported were engaged in a hopeless struggle. The Britannia, with those ships which had been ordered to keep her company, was above two thousand yards from the forts; and their fire, although unceasing, was ineffectual.

A thick smoke, scarcely swept away at intervals by the light breeze, enveloped the fleets. It was but by the thunder of their broadsides, which rose even above the roar of artillery from the land batteries, that a spectator could know the fearful contest which was going on. The sun went down before it ceased. Slowly the Agamemnon retired—having discharged no less than 3250 shot into the enemy. Well had her noble commander said that morning, 'that he would rather sink with his ship than that the honour of England should be tarnished!' And well worthy was he of the tribute spontaneously paid to him by the admirals and officers of the French fleet, who declared that although they had been left for nearly two hours to bear the whole of the enemy's fire, he, at least, had maintained the antique fame of the British navy.

Who could watch the fall of that day without a heavy heart? We had failed, and a long and terrible struggle was in store for us. We had foolishly underrated the enemy's resources, and had allowed him to put forth his strength. An occasional explosion in the Russian batteries or a well-directed shot might raise, for a time, the enthusiasm of our men, but it was too evident to all reflecting persons that we had now entered unprepared upon a gigantic undertaking.

Two days elapsed before the French batteries were able to reopen their fire, so destructive had been the explosion. For three days the English batteries continued theirs with some vigour: after which the siege may be said to have ceased on our part, whilst our allies slowly continued their approaches.

What then were the results of the combined attack on the 17th of October? And first, in regard to the fleet. It had always, we understand, been the conviction of Sir Edmund Lyons that the question of the superiority between ships and stone walls depended entirely upon distance. This conviction was borne out. Had the depth of the water permitted the Agamemnon and Sanspareil to approach within three or four hundred yards, Fort Constantine would probably have been destroyed. Its walls were so much shaken



shaken that they have been since supported by wooden shores and props. Prince Menschikoff, in his despatch to the Emperor describing the results of the day, mentions the injury they had sustained.* The Russians, moreover, anticipating another attack, have since constructed earthworks *to protect* this enormous stone-work; thereby admitting themselves its weakness. Three times the fire of the Agamemnon silenced that of the fort; and had the whole fleet been near at hand, the object of the attack would probably have been attained. The broadsides of the French ships crippled, to a certain extent, the Quarantine Fort; but their distance, more than 1500 yards, was too great to be effective. The Agamemnon, although the nearest to the batteries, had four killed and twenty-five wounded: the Albion, exposed to the Wasp Fort, which was surrounded by *earthworks*, suffered most, having ten killed and seventy-one wounded. The Sanspareil had eleven killed and fifty-nine wounded; and other vessels proportionally. The Britannia, which had taken up the furthest position from the enemy, had only nine slightly wounded. On the whole it may, therefore, be admitted that the attack of the combined fleet failed, whatever may have been its object: the loss of men and the injury to the ships were not compensated by the damage inflicted on the enemy. We have reason to believe that Sir Edmund Lyons was not in favour of operations by sea on the 17th, unless either an assault was at the same time attempted from the lines, or the fleet was so used as to be maintained in a condition to renew the attack at any subsequent period when an assault became practicable. The result of the attack proved the soundness of his opinion.

By land little more had been effected than by sea. The explosion in the French lines was a serious disaster to our allies, and a source of considerable inconvenience to us. Some of the Russian batteries, which had been directed upon them, were then turned upon the English works, and inflicted much injury. We had several guns dismounted and destroyed, and suffered some loss in men, but less than might have been expected from the unceasing and well-directed fire of the enemy, of whose skill in gunnery we had now fresh proofs. The Russians may have lost many lives, and their works may have been damaged, but their fire remained unchecked. The only part of their defences completely disabled were the two stone towers. The earthworks, raised in a few hours around them, with others of a similar

* There is an impression that some, if not all, of the forts at Sebastopol are built of granite. Such is not the case. They are entirely constructed of the soft limestone found on the heights around the town. The quarries from which this material is obtained are now occupied by the allied armies.

nature,

nature, continued to defy all our efforts. Well might our engineers say, after our fire had been opened for some days, that if we could only reduce Sebastopol to the condition in which we had found it on the 26th of September, we might, with some chance of success, attempt an assault.

But with what means at our command had we undertaken to besiege a stronghold almost unequalled for its strength and the extent of its resources? History scarcely presents an instance of a more ill-digested scheme! We had brought with us a siege-train of sixty guns, including mortars, nearly all of a calibre inferior to those of the enemy. The French had a larger number, but they were of brass, and consequently inferior for all purposes to those of the besieged. In order to arm even three batteries we were compelled to dismantle our ships and to employ our seamen. More than eight hundred rounds can rarely be discharged from one gun, on account of its liability to burst and the enlargement of the vent. Few guns, indeed, will bear much above six hundred rounds. As during the first day we had fired above one hundred rounds from each gun, if we had continued at this rate, in less than six days our batteries would have been disabled. The amount of ammunition available was so small that it would have been completely expended in about five days. Some of the most useful guns had only been supplied with one hundred and twenty rounds each. The number of our artillerymen was so inadequate to the working of the siege guns that we were compelled to cease our fire during the night; and thus the enemy was able to repair unmolested the damage done to his earthworks during the day. Even to keep up a moderate fire from sunrise to sunset, and to have the proper reliefs for night-work, the officers and gunners were only every alternate eight hours off duty, which, deducting nearly an hour, the time required to go from the camp to the trenches, left but six for food and repose—an amount of labour which human nature could not long endure. Moreover, every day added to the list of the killed, wounded, and sick, and diminished the number of those fit for active service. Our materials were not only inadequate, but in many instances bad. A large proportion of our shells, owing to some defect in the fuses, either did not burst at all or not at the right moment. We understand that a British officer who was made prisoner states that nothing struck him more in Sebastopol than the number of unexploded English shells lying about—a cause of equal surprise to the Russian engineers. The newly-introduced Madras platforms for the siege guns proved a failure. Not only was it impossible to traverse the guns upon them, but they were soon broken



broken by the recoil. By the end of the second day of the siege scarcely one remained entire, and the engineers were compelled to substitute for them such planking as could be procured in the country. The siege-train had only been supplied with two or three spare gun-carriages; several having been soon destroyed, it was subsequently dependent upon those furnished by the ships. There were no adequate means of transport for the ammunition from Balaklava when it was landed: the shot was mostly carried by pack-horses in bags slung across their backs! With such materials and with such foresight did Government send out an army to capture one of the strongest fortresses and arsenals in the world! If any calamity should befall the British arms, the future historian will be at a loss for words to describe the incompetency, and to condemn the guilt, of those who thus exposed to destruction the most gallant army that nation ever sent forth.

It is but an act of justice to the engineers, and more especially to that brave, skilful, and zealous officer, Captain Gordon, who after the death of Colonel Alexander succeeded to the command, to add that our batteries were admirably constructed. No accident whatever has happened to our powder magazines, although more than once exposed to the test of the fall and explosion of a twelve-inch shell. When contrasting our works with those of our allies, it must be borne in mind, that whilst our batteries were from 1300 to 1700 yards distant from the enemy, those of the French had approached to within 800 yards, and were consequently far more exposed to injury.

The attempt to silence the enemy's batteries having thus proved hopeless, every means should have been employed in fortifying the ground held by the British army, and rendering it as secure as possible from attack. We have already stated that our position on the heights was considerably weakened by the imperative necessity of including Balaklava within our lines. The defences of that place had been entrusted to a young officer of Engineers, under whose superintendence were erected the redoubts indicated upon our plan.

About the 20th of October, a movement had taken place amongst the Russian troops on the right bank of the Tchernaia. On the 24th a considerable body of infantry, cavalry, and artillery was observed to have bivouacked at the mouth of a valley, through which the high-road from Simpheropol and Odessa debouches into a small plain. Deserters declared that a fresh *corps d'armée*, under General Liprandi, had arrived from the Principalities. The report was scarcely credited until it was too fully verified on the morning of the 25th October.

By

By referring to the plan, it will be seen that an isolated ridge rises from the left bank of the Tchernaia, and advances towards Balaklava, ending abruptly in the valley: we will call it the Tchernaia ridge. It is traversed by a deep ravine, through which runs the road from Simpheropol. Overlooking the valley of Balaklava, it is commanded by the heights occupied by the allied armies. Dividing the valley to the south of this ridge into two parts is the undulation, upon which had been constructed the four isolated redoubts we have described, held by small bodies of Turkish and Tunisian troops. This important position was so ill defended that only one regiment of Highlanders, and a single battalion formed of invalids from various regiments, could be collected in case of need. The camps of the Highlanders, of the Turks, and of the British cavalry were about a mile and a half in the rear. The whole position was, to a certain extent, commanded from the south by the redoubts on the high hills overlooking the harbour of Balaklava, held by a corps of Marines.

Soon after sunrise, on the 25th of October, the enemy opened their fire upon the foremost redoubts from a battery of heavy guns, which had been brought during the night to the southern edge of the Tchernaia ridge. It was immediately returned by the Turks, and by a French battery on the Sebastopol heights. At the eastern end of the valley of the Tchernaia, infantry, cavalry, artillery, were drawn up in several massive lines, in order of battle. This was the main body of Liprandi's corps. Behind the Tchernaia, on the Simpheropol road, was stationed its reserve.

The firing from the batteries had continued for a short time without much result on either side, when a movement was observed in the enemy's ranks. A large body of cavalry advanced steadily down the valley, whilst a column of infantry moved along the foot of the hill to the first redoubt, which was now the object of their attack. The Turks maintained a well-directed fire for about twenty minutes, when the Russian cavalry, under cover of the batteries on the Tchernaia ridge, turning towards them, they were no longer able to persist, but retired in good order, although suffering considerable loss. The Russian infantry took possession of the redoubt and deserted guns. Those who held the two following redoubts, seeing their comrades retire, followed their example, without an attempt to maintain themselves, and the works were speedily occupied by the enemy, the guns having been spiked, though ineffectually, by the English artilleryman, who had been placed in each. The fourth redoubt making a show of defence, the Russian cavalry did



did not persist in attacking it, and the enemy soon afterwards abandoned the third.

Much unmerited blame has been cast upon the Turks for their conduct on this occasion. Although undoubtedly British or French troops would have defended to the last, if necessary, the redoubts confided to them, yet we question whether any officer would have been justified in attempting to hold them under the circumstances. They were too distant to receive any aid or support from the small and totally inadequate force in front of Balaklava. They were so ill-constructed that the Cossacks had no difficulty in leaping their horses over them. Had the Turks remained a few minutes longer, none could have escaped, and an unnecessary and useless sacrifice of human life would have ensued. General Canrobert, on descending later into the plain, did not hesitate to declare that these redoubts were untenable, consequently no attempt was made to recapture them from the enemy. This opinion has, we understand, been fully confirmed by the highest military authority in this country. Sir Colin Campbell, in his despatch describing the action, says 'that the Turkish troops in No. 1 redoubt *persisted as long as they could, and then retired, and they suffered considerable loss in their retreat*;' and Lord Raglan observes 'that the means of defending the extensive position which had been occupied by the Turkish troops in the morning had proved wholly inadequate.'

We make these remarks because we believe that a very unjust and very mischievous cry has been raised both in the British camp and in England against the Turkish troops. We may add that those who held the redoubts were chiefly Tunisians, with a small body of Turkish militia, not one having, we believe, been under fire before. The officers were the first to leave their posts, and the men were left without any command whatever. The clamour of ignorant people in this country has unfortunately had its influence on public opinion. And yet, after the gallant stand made by the Ottoman army on the Danube, we should have paused before thus condemning by wholesale Turkish troops. This stupid cry, and a prejudice which exists in some quarters, may have prevented the British Government availing itself of the services of men who, if properly commanded, would not be exceeded in courage, devotion, and conduct by any troops in the world. Instead of seeking for Germans, we could have found 70,000 men already collected and partly organised, who only wanted better officers and regular pay to equal, if not exceed in efficiency, any foreign troops we can hire to fight in a cause not their own. We have the testimony of that distinguished soldier Major Nasmyth to the bravery and docility of

 those

those who fought under him at Silistria. With such a leader as he has shown himself to be, the British Government might shortly be in possession of a Turkish contingent upon which every reliance could be placed. As it is, we have permitted Omar Pasha's army to be nearly broken up for want of money to furnish the necessary means of support; and, with an inhumanity disgraceful to those concerned, we have permitted thousands of miserable wretches to be cast upon the shores of the Crimea to be insulted and oppressed, and to die of exposure and starvation. We know nothing more shocking and more touching than the accounts transmitted to this country of the condition of the unfortunate Turks at Balaklava, and of the manner in which they have been treated. It is not unnatural that in a camp where heroic courage and devotion are the virtues of almost every man, those who abandoned under any circumstances, in the moment of danger, the post confided to them, should be received with some feelings of contempt and distrust. But the resigned, uncomplaining way in which these poor starving men, dragged from their homes, deserted by all, without pay, without food, without medical aid, and without shelter—dying in the streets and highways untended and uncared for—enduring privations and sufferings far exceeding those of our troops, greatly as even they have suffered—have borne the hard and loathsome tasks imposed upon them, ought to have shown their persecutors that they had in them some of the best elements of the military character. We trust that the ungenerous and unjust outcry will cease, and that the Government will not shut its eyes to the immense value of such men if properly led and adequately cared for.

But to return to the battle of Balaklava. The redoubts having been carried, the Russian cavalry, supported by a considerable force of artillery, ascended the low ridge upon which these works had been constructed. They then divided into two bodies; that to the left, the smallest of the two and consisting of about 400 men, charged down the slope towards the 93rd Highlanders, which, having at first taken up a position in front of the fourth redoubt, had now retired beyond the crest of the hill. That gallant regiment, led by Colonel Ainslie, was ordered by Sir Colin Campbell to receive the enemy in line. The Russian cavalry were checked by the first volley, and without, it is believed, suffering any loss whatever, fell back in some disorder. Perceiving that the Turks, who had formed on the right flank of the 93rd, were again retreating, they were encouraged to attempt a second charge; but the grenadiers of that regiment wheeling round and opening upon them, they again retired.

The second and larger body of cavalry, estimated at between





900 and 1000 men, turned to the right and advanced towards the camp of the Scots Greys and Enniskillen Dragoons. These regiments, returning from the position they had at first taken up beyond the ridge to the left of the line of redoubts, were just in time to form and to meet the Russian charge. For a moment there was a hand to hand fight, and the mingling of horses and men and the clashing of steel; but borne down by the weight and determined onslaught of the British squadron—scarce one-third their number—the Russian cavalry recoiled and were beaten back up the hillside. They made one effort to rally, but were again broken, and now fled in disorder over the plain.

The heavy cavalry was supported by the troop of Horse Artillery under Captain Maude. A shell bursting near that officer, deprived the army for a time of the services of one whose gallantry and noble bearing had earned for him the admiration of the whole British army.

The 1st and 4th English divisions, with a considerable body of French troops of the line, Chasseurs de Vincennes, and cavalry (Chasseurs d'Afrique), had descended from the heights to the support of the small force opposed to the enemy in the valley. The heavy and light brigades of British cavalry were drawn up in two long dark lines on the northern slope, between the third and fourth redoubts. The enemy kept up their fire from the second redoubt, in which they had placed artillery, and occasionally from the battery on the Tchernaia ridge, without however inflicting injury upon us. Although two redoubts and seven guns remained in the possession of the enemy, yet as far as the defence of our important position and the conduct of our troops were concerned, we had good reason to be well satisfied with the results of the day.

Lord Raglan, with his staff, was watching the contest from the edge of the high cliff overlooking the valley in which the fight had hitherto been waged. The withdrawal of the Russians from the third redoubt, and an apparent movement in the next, led the English Commander-in-Chief to believe that the enemy were removing the captured guns. Under this impression the order which has been so much canvassed was addressed to the Earl of Lucan. It was confided to Captain Nolan, a cavalry officer serving on the staff, upon whom much animadversion has been cast as having been the principal cause of the catastrophe which ensued. But whatever may have been his conduct, and the irritation it may have caused, we conceive that the very fact of his having been the bearer of a *written* order relieves him from all responsibility.

By the time the Earl of Lucan received the order to advance

and to prevent the removal of our captured guns, the enemy had formed again in front, a dark mass of cavalry and infantry supporting his heavy artillery. A reference to the plan will show the position of the Russians at this time. The main body of Liprandi's corps d'armée was drawn up in order of battle at the bottom of the valley. Considerably in advance of it, and crossing their fire, were the batteries in the first two redoubts and that on the Tchernaia ridge. The steep sides of the hills were thick with riflemen, supported by columns of infantry.

It was through this deadly approach and in the face of an overwhelming mass of the enemy that the Earl of Lucan, misunderstanding the order to advance—for the Russians, instead of removing the captured guns, as Lord Raglan had anticipated, had turned them upon us—directed the British light cavalry to charge. The Earl of Cardigan, its commander, ventured, we believe, to ask a very natural question, 'what his brigade *was* to charge?' The enemy, he was told, was before him, and the peremptory order was reiterated. Having like a prudent man remonstrated, he proceeded like a brave one to perform his duty. He led forward his squadrons in two lines at a steady pace. Calmly and undismayed they advanced, whilst those who looked down upon the scene watched them, motionless and with bated breath, as men who were hurrying to sure destruction. The white smoke now burst forth before them and on either side. In front rode Captain Nolan, waving his sword and urging his men to the charge. Suddenly his upraised arm remained motionless, and, as he uttered a cry of agony and despair, the glittering ranks passed on: a trooper held his horse, and he fell to the ground. Still the British cavalry did not quicken their speed until they could see each man in the lines drawn up before them. Then, amidst the smoke and roar of artillery, they rushed onwards. Soon reaching the gaping mouths of the guns, they scattered and cut down those who stood round them. The heavy columns behind swerved and opened their ranks to the impetuous stream. Regiments of Hussars and Dragoons sought to check their onward course, but in vain. They did not draw bridle until no enemy was left before them. Scarce 600 English light cavalry had broken through a Russian army!

But of what avail was this desperate deed? The heavy brigade had advanced in support of those who charged; but, checked by the heavy fire, they halted far behind. It was then that General Bosquet spoke those words which so well characterise the heroic valour of the British soldier, and at the same time the wanton way in which his noble life is too frequently sacrificed, 'C'est magnifique, mais ce n'est pas la guerre!' He saw that if any had escaped from that fearful



fearful encounter and sought to return, they would still be exposed to the undiminished fire of the flanking batteries. The 'Chasseurs d'Afrique' were, therefore, ordered to silence the guns on the Tchernaia ridge. Sweeping down into the valley, this fine brigade of cavalry formed into line. Their commander, unwilling to sacrifice uselessly the lives of his troops, checked their ardour, and one squadron alone was directed to charge the enemy's artillery. With a courage and daring not even excelled by that of the brave men to whose aid they were sent, the gallant band struggled, through thick brushwood and over rocky ground, up the precipitous slope. As they reached the summit, each, singling out his man, rushed upon the rear of the battery, cutting down all who ventured to oppose them. For a moment they held the guns; but two heavy columns of infantry, hitherto concealed in a deep ravine, now appeared behind them. Concealed and sheltered by the thickets, they opened a deadly fire. The battery had been silenced and no more could be accomplished; the scattered horsemen retraced their steps to the plain, leaving two officers and fourteen men dead upon the field. They had performed a feat which, though eclipsed by the unparalleled onslaught of the British light cavalry, well deserved the grateful admiration of the British army. To them we owe the lives of those who came back, one by one, some on horse, some on foot, from that fatal charge.

The end of the valley was spotted with the bodies of men and horses. The Cossacks, who had quailed and fled before our horsemen, now returned with confidence. As the wounded lay writhing on the ground they pierced them with their spears; but, as if fearing them even in death, five or six together were seen to gather around one helpless and dying man, —not the only instance of that barbarous cruelty which will remain an eternal stigma upon the Russian name.

That evening nearly two-thirds of the British light cavalry were absent from the muster. It was matter of wonder how even those who survived had escaped. During the night and the following day others who, wounded and unhorsed, had crept for safety into the bushes and crevices of the rocks, straggled into the camp, and the army had fewer to lament than was supposed at first. But still above 230, of whom fifteen were officers, were killed and remained prisoners in the hands of the enemy. Twenty-seven officers were, moreover, wounded, several of whom are since dead.

After the charge of the light cavalry, the generals-in-chief of the allied armies left the heights from which they had viewed the events of the day, and, with their staffs, stationed themselves upon the

the ridge in front of the fourth redoubt. The fire of the enemy had ceased, and they stood, as if awed, in sullen silence. Sir George Cathcart now proposed to recapture by assault, with his division (the 4th), the redoubts and lost guns. But General Canrobert insisted that to retake works which, from their defective construction and their distance from each other and from every support, could not be held against an enemy, would only lead to a useless sacrifice of life. It was consequently decided that we should abandon altogether the outer line of defences, and should now concentrate and increase our forces on a narrow ridge which closes the mouth of the small valley ending in the harbour of Balaklava, and on the hills commanding the town, and should reinforce the British troops by some French regiments, who, aided by the Turks, should at once construct breastworks and redoubts, uniting the heights on either side. The important position of Balaklava would thus be completely enclosed by an adequate line of defences.

The result of the Russian attack on the 25th October may be summed up in a few words. The enemy were taught to fear our cavalry, and the great efficiency of that arm of the British army was proved beyond a doubt. Few Russian horsemen will hereafter stand before men who neither yield to numbers nor to weight. On the other hand, the enemy's cavalry had shown itself irresolute in action and wanting in courage, fully confirming the opinion which had been formed of it from its conduct during the previous part of the campaign.

We have already observed, that although the French had fortified that portion of the heights which was occupied by the 'Corps d'Observation' under General Bosquet, with trenches, earthworks, and redoubts, the English had completely neglected to protect the edge of the plateau held by our 1st and 2nd divisions to the north of the Woronzoff road; even two roads leading up from the valley of Inkerman in the rear of our second division had been left comparatively open. This neglect had been pointed out by Sir De Lacy Evans and the Duke of Cambridge; the former had endeavoured to throw up a few breastworks of stone and earth, but they were close to the camp and completely inadequate for the protection of this most important position. On the night of the 25th he had been called upon to furnish 800 men for the defence of the trenches; but impressed with the danger which threatened our army on this side, and the possibility of an attack at any hour, he remonstrated. In consequence of this opinion the order was rescinded, and he was thus able to meet on the following day what had been so long foretold—an attack upon this undefended part of our lines.

On



On the morning of the 26th several Russian columns of infantry, accompanied by artillery, were seen to issue from the eastern end of Sebastopol. It was at first believed that they were marching to join Liprandi's corps by the road, still open, through the Inkerman valley; but turning to the right they ascended the hill, and suddenly appeared on the crest which commanded the camp of the 2nd division. Another body at the same time approached by the road leading from the valley to the heights. They came somewhat by surprise upon the pickets belonging to the 30th and 49th regiments. The conduct of an officer at the head of one of these small parties excited universal admiration. Holding his ground with undaunted courage against an overwhelming force, he succeeded in checking for some time the Russian advance; and when the ammunition of his men was expended, charging the enemy with his sword, he fell shot through the chest: this was Lieutenant Conolly of the 49th. Scarcely less distinguished were Captain Bayley and Captain Atcherley, and a serjeant named Sullivan, at the head of the pickets of the 30th regiment. This handful of brave men opposed nearly 7000 men until Sir De Lacy Evans was able to mature his plans and to form his two brigades into order of battle. That commanded by Major-General Pennefather was placed upon the left in advance of the camp; that under Brigadier-General Adams upon the right, supported by the artillery of the 1st and 2nd divisions under Colonel Fitzmayer and Colonel Dacres. So admirably were the troops disposed, and so well were the efforts of their General seconded by those who, serving under him, were inspired with that confidence which perfect reliance upon a commander will at all times give, that the enemy was not only speedily repulsed, but, taking to flight, was pursued almost into the town, with a loss subsequently estimated at nearly 1000 men, whilst our own amounted to only 12 killed and about 80 wounded. One hundred and sixty Russians were left dead within our lines, and 30 prisoners fell into our hands. The second division alone, at that time scarcely 1200 strong, defeated nearly 8000 men. The Guards, under the Duke of Cambridge, although protecting its flank, took no part in the action, nor did the corps of General Bosquet, who, as was his wont, hastened to our aid as soon as the enemy appeared.

In this action, again, the execution of the Russian plan of attack was not equal to the conception. As it is impossible that the enemy could have contemplated, with so small a number of men, the permanent occupation of the position, it is probable that, after having reconnoitred it, they intended, having forced our lines in their weakest point, to take our batteries of the right

attack

attack in reverse, and having destroyed them and spiked the guns, to return into Sebastopol.

The attempt, although unsuccessful, should have been a further warning to us; but nothing was done towards fortifying these heights. It has been alleged that there was a want of men to construct proper defences; but after the 5th of November, although no new reinforcements had arrived, troops were found. In truth the position was of such vast and paramount importance that any sacrifice should have been made to protect it. The enemy, although they did not succeed in their attempt, so far profited by it that they ascertained the weakness of our defences.

In the meanwhile large reinforcements were daily joining the Russian camp to the north of Sebastopol. Extraordinary efforts were being made to bring down those troops which the Austrian occupation of the Principalities now placed at the disposal of the Czar for the defence of the Crimea, and all the resources of the country were employed for this purpose. Carts, carriages, post-horses, bore one corps d'armée from Odessa to the Belbec. Before we even received notice of their approach fifty thousand men were collected on the heights of Inkerman, the greater number of whom the generals of the allied armies had been assured from home were still watching the frontiers of Bessarabia in expectation of an Austrian invasion!

Prince Menschikoff resolved, by one great effort, to force our ill-defended position, which, once carried, would place the allied armies at his mercy. His plan was well conceived. Our front was exposed, our flank and rear open, and he could pour his columns from all sides upon our devoted bands, before we could even know that they were near. A despatch, written to the Emperor, his master, some days before the execution of his design, betrays the confidence he felt in its result, and the almost mad excitement of his brain at the prospect of success. 'A terrible calamity,' he wrote, 'impends over the invaders of your dominions. In a few days they will have perished by the sword, or will be driven into the sea. Let your Majesty send your sons here, that I may render up to them untouched the priceless treasure which your Majesty has entrusted to my keeping!' Two days before he was to fulfil his pledge, two imperial carriages, preceded by outriders, and accompanied by an escort of cavalry, were seen to enter Sebastopol by the high road from the north, and the sound of rejoicings came up from the city.

Soon after midnight, on the morning of the 5th of November, those who guarded the trenches and lay sleepless in their tents listened



listened to the tolling of bells, as for some sacred ceremony. The distant sounds of chanting are even said to have been heard by persons who watched still nearer to the beleaguered city. The solemn peal ceased about two hours before daylight, and was succeeded by the bright flash and heavy report of ordnance in the rear of the British lines. After a little time there was again deep silence, only broken by a low rumbling heard by the furthest pickets, who thought it to be the noise of waggons laden with supplies entering the town.

The dawn long struggled through the mist which hung on the heights of Sebastopol. As daylight broke a party of unarmed men appeared on the crest of the hill, above the eastern end of the harbour of Sebastopol, and in front of the second division of the British army. They made signs as of surrender to the pickets which watched those heights. The officer believing them to be deserters advanced to receive them. Having thus been thrown off his guard, he and his men were suddenly surrounded and seized by a large body of troops who had lain in ambush behind the ridge. An alarm was thus avoided, and the first Russian columns were fast drawing near to the British lines, partly concealed by the mist, before they were perceived by the remaining pickets, which gave notice of their approach, and boldly resisted and checked the advance of the enemy. They only fell back when their ammunition had been expended, and when completely overpowered by the weight of succeeding masses of men. The second division, to which, though reduced to nearly half its numbers by battle and disease, was still confided the important post now menaced, had scarcely time to collect to receive the Russian advance. Their able and experienced commander, overcome by his duties, anxiety, and disease, was on a sick bed at Balaklava. General Pennefather had taken his place. He hastily formed the decimated regiments, and rapidly led them to meet the enemy who were pouring in dense masses over the hill. Soon they opened the deadly fire of the Minié, making havoc from afar amongst the approaching columns. The Russians, seeing that the British troops were now preparing to receive them, rushed forward with loud and discordant yells rising above the roll of musketry and the roar of artillery—a sound—how unlike the hearty English cheer!—never to be forgotten by those who heard it on that memorable morning. At the same time their numerous artillery, which had been brought to the edge of the hill over which they had been so noiselessly dragged, and the guns of the town and ships of war, threw an unceasing volley of shot and shell not only into our troops but even beyond their camp, tearing

tearing to pieces the tents and killing the horses which were still fastened to their pickets. The batteries of the 1st and 2nd divisions soon took up a position on a rising ground in front of our lines, and sought in vain to check the heavy fire.

Whilst fresh columns ascended the hill facing the end of the harbour, others, winding round its base, threatened our flank by a road through a deep ravine, and our rear by a second track leading up from the Inkerman valley. Another large body advanced towards the five-gun battery through a narrow gorge, stretching from 'Careening Bay' almost into the centre of our position.* Thus was the right of the allied armies menaced on all sides by overwhelming numbers.

The Guards were in the immediate rear of the 2nd division, and consequently the nearest to the point of attack; the Grenadiers and Scots Fusileers lost no time after the first shot was fired in hurrying forwards. The greater part of the brigade had but just returned from the trenches, in which they had been exposed to rain since an hour before daylight on the previous morning. Benumbed with cold, wet, long without rest, and for many hours without food, they were led against the enemy. As they advanced, justly anticipating that the enemy would ascend in force by the road in the rear of the second division, they turned to the right. On a small spur, some way down the precipitous hill overlooking the valley of Inkerman, was a small battery built of sandbags and fascines: it had held two siege-guns, placed there to silence a gun which, mounted by the Russians on the opposite heights, above the ruins, had caused much annoyance to our camp. The desired object having been effected, the two guns, being required elsewhere, had been removed. The unarmed battery was occupied on that morning by a picket of the 55th Regiment. In front of it, before daylight, the enemy had brought up heavy guns, which opened suddenly upon this small body of men. Surprised by an overwhelming force, and unsupported by their own division, they were compelled to fall back, after making for a short time a vigorous resistance, and losing nearly two-thirds of their number. As they retreated the Guards were advancing to the spot: seeing that the pickets were retiring before the enemy, who had already taken possession of the battery, the Grenadiers, giving a loud cheer, charged down the declivity. It was the work of a moment. The Russians were driven headlong from the work. The three regiments of Guards, the

* In the plan we have given, to which we refer our readers, these roads are indicated, as well as the position of our army on the morning of the 5th November.

Coldstreams



Coldstreams having soon after joined the rest of the brigade, held the battery, formed into line at right angles to it, and occupied the ridges of the projecting spur.

Then commenced a struggle which has rarely if ever been equalled in modern warfare. The columns of the enemy, unchecked by the English fire, again impetuously advanced with fearful yells up the slope, attempting to turn the right flank of the Guards. The Grenadiers, united with the Coldstreams, met the approaching columns with a second charge. Again the enemy were driven back, but again, urged onwards by the overwhelming numbers behind, they returned. The ammunition of the Guards was nearly expended, and their ranks broken and thinned by those who had fallen in this bloody contest; but still they held their ground—firing upon the advancing foe on one side, rushing with the bayonet upon those who attempted to surround them on the other. Fresh supplies and some reinforcements from the 4th division at length reached them. But still the Russians pressed on with undiminished strength. Again our brave men were in need of ammunition, and were fast falling before the unceasing fire of the enemy, who, concealed by the thick brushwood and by the undulating ground, had now succeeded in surrounding them. They could but give way. Charging with desperate fury, they bore their colours triumphantly through the dense mass. Reaching a breastwork which had been raised at some distance behind the battery, they formed again, and with the bayonet prepared once more to dispute every inch of ground. During more than five hours this heroic brigade almost alone resisted the attack of an overwhelming force, supported by a heavy and continuous fire of artillery. Nearly two-thirds of their numbers were mown down in this hand-to-hand fight. Yet they knew that the safety of the British army depended upon them, and they nobly held their own—each man performing deeds of almost unexampled heroism.

The 4th division, whose camp was far distant, had early hastened to the point of attack led by Sir George Cathcart, but they did not reach it until after the Guards had long been engaged in the struggle for the possession of the two-gun battery. One brigade under General Goldie was detached to the assistance of the 2nd division, now hard pressed on the left by the increasing columns of the enemy. The other, commanded by General Torrens, turned to the right and sought the Guards, who were almost surrounded. Sir George Cathcart believed that the most effectual succour could be given them by turning the enemy's flank, and thus compelling them to fall back from the disputed battery. Unwilling to credit the earnest representations made to him

that

that the Russians had already occupied the opposite heights, he placed himself at the head of a few companies of the 68th Regiment and with undaunted spirit entered a gully to the right of the earthwork. But he had scarcely descended far before he perceived the Russians on the ridges above him. He saw, too late, that he was surrounded. Attempting to lead back his men, this distinguished officer fell mortally wounded, and his body remained for some time in the midst of the enemy. His gallant aide-de-camp, Col. Charles Seymour, who had long shared the fortunes of his chief, and who stooped to receive his last breath, perished by his side.

But a contest no less terrible than that around the two-gun battery raged on the hill above the harbour, on which the Russians had first appeared, and which was separated by a deep ravine from that held by the Guards. The ground was covered with low and thick brushwood, and was much broken. A cloud of skirmishers thrown out by the advancing columns were thus able to keep under sufficient cover, and to inflict considerable loss upon our troops, who could with difficulty advance in line. The 2nd division had been joined by a brigade of the 1st—together they rushed upon the enemy, and for some moments held him in check. Their ammunition having been expended they even received the approaching columns with stones, until exhausted they were forced to retire. Under cover of the incessant and well directed fire of their artillery the Russians advanced with renewed confidence, charging our retreating regiments and redoubling their unearthly yells. Four of our guns were already in their possession, and they were almost in the midst of the tents of the second division. For a moment the issue of the day seemed doubtful, and the sternest heart felt a thrill of doubt and dread. But again, by superhuman efforts, our broken regiments rallied, charged into their dense ranks, drove them back in disorder, and recaptured the guns.

General Bosquet, as usual, had lost no time in ascertaining the nature of the attack, and had ordered two battalions of infantry to aid in the defence of the British position. He would have hastened himself to take part in the contest with a larger force, but, the Russian fire suddenly slackening between eight and nine o'clock, Sir George Cathcart, under the impression that the enemy were retiring, sent to inform him that there was no longer need for his immediate advance. At an early hour of the morning a movement had taken place in the corps d'armée, under Liprandi, in the valley of the Tchernaia. A column of infantry, with riflemen, had advanced to the foot of the heights, and had exchanged shots with the Zouaves and French troops defending



defending that part of the position. The batteries on the Tchernaia ridge and in the redoubts, and some field-pieces, opened upon Balaklava and upon the edge of the plateau, in rear of our lines. This fire was returned, and having been continued on both sides for some time, without any apparent effect, the Russians fell back, but still appeared to threaten a further advance. Such being the case, General Bosquet could not withdraw the troops which defended this part of the position, and, for a time believing it possible from the slackening of the fire in front of the British camp that, after all, the real attack might be made in the rear, he speedily returned to his own post. But the Russian artillery had only ceased awhile, to draw nearer to the English camp under cover of the mist which still prevailed. Soon after it opened again with redoubled violence. Fresh bodies of men at the same time came over the crest of the hill and up the ravines. Our regiments, no longer able to oppose their shattered lines to the exhaustless stream of men, were forced back at all points, and were retreating mingled together in complete disorder.

This was the most critical period of the day. More than an hour had been lost by General Bosquet's return to the rear. He now learnt the magnitude of the danger. Presuming that General Liprandi's attack was but a feint, with the decision and courage of a true general he resolved at once to act upon the supposition. Leaving, therefore, his position almost undefended, he brought nearly the whole of his force to the aid of the English. Advancing to the verge of the range of the Russian artillery, he halted his troops, and, surrounded by his staff, rode himself into the midst of the conflict. At this instant the dispersion of the mist revealed the scene for the first time. He surveyed it with a calm and practised eye; he returned to his men, and, making the dispositions he deemed necessary, gave orders for the attack. The field-artillery covering the left of our position was now nearly overpowered by the superior weight and range of the Russian guns. A heap of dead and wounded men and horses mingled together proved the deadly nature of the enemy's fire. General Bosquet sent two troops of horse-artillery and one field-battery to protect and assist our guns. At full speed they swept before our almost disabled batteries, and taking up a position in front of them, amidst the cheers of our men, opened a rapid and well-directed fire upon the enemy's powerful artillery; but still the allies could not contend against the superior weight and length of range of the Russian ordnance.

It was, however, in the rear of the 2nd division, in the ravines, running up to the two-gun battery, where the Guards were engaged in the deadly struggle, that the danger threatened most;

most; and it was to that point that General Bosquet principally directed his troops. A regiment of Zouaves, and of Indigènes or Arabs, were accordingly ordered to charge the enemy, who covered in one dense gray mass the sides of the hills. Rushing headlong upon the Russians with an impetuosity that nothing could withstand, they drove them back in confusion. These brave and intelligent troops on this day well sustained their reputation. Not affecting the calm and steady advance of the British lines, they scattered themselves over the broken and undulating ground, seeking for every irregularity in the soil; sheltering themselves behind the brushwood and rocks; firing with deadly accuracy into the opposite columns; then suddenly darting forward, and with irresistible daring throwing themselves upon the wavering ranks, they struck terror into the Russian infantry. 'See!' cried their brave general, as he gazed with admiration upon them; 'see! they bound like panthers from the bush!'

The French troops of the line, moving forwards more steadily in support of our broken regiments to the left, were exposed to a heavier fire from the Russian artillery on the ridge, as well as from the batteries of the town and ships. For a moment they quailed before it. Then with loud shouts of 'Vive l'Empereur!' and amidst the cheers of the English, they charged with the bayonet. Thus relieved, our disordered regiments were able to form again; and when their allies, in their turn, were overpowered by numbers, they once more rushed upon the enemy. Soon the various uniforms of the two nations were mingled together: English regiments charging with French; their shouts of defiance and of victory rising together, and their blood moistening the same soil. Both were inspired with a generous rivalry, and returned with fresh ardour to the fight. Nothing could resist such men animated by such a spirit. The vast wave, which threatened at one time to overwhelm the British camp, again broke upon these heroic bands, and rolled back over the heights.

The Russian artillery, however, maintained its position, and by its incessant and vigorous fire encouraged the renewed attacks of the infantry. It has been estimated that the enemy had no less than ninety guns in the field on this day, almost every one being superior in weight and range to those possessed by the English. A large number were 'guns of position,' that is, cannon of too large a size to be commonly used in the field, and intended for permanent works. Moreover, the fleet and town batteries threw a continual volley of heavy shot and shell into our lines. The contest at one time of the day, when a bright sunshine



shine had dispelled the mist, was becoming a mighty duel of artillery to be decided by the number and weight of the guns on either side. As yet the allies had been almost overpowered, and had suffered most severe losses. We had still two 18-pounders remaining in the park of the siege-train. Lord Raglan ordered them to be brought up to the front. The execution of this order was declared to be impossible, but Colonel Dickson had already anticipated it, and prepared to carry it into effect, Colonel Gambier, who commanded the siege-train, being wounded. By the help of men and horses he dragged the heavy guns through roads deep in mud, and over the rough ground. Reaching at last a ridge in front of the camp of the 2nd division, he proceeded, although exposed to the heaviest fire, with admirable calmness and judgment, assisted by Captain D'Aguilar, to place them in position. He well knew how much depended upon the steadiness and accuracy of their practice. They were opposed to a large number of guns of equal if not heavier calibre. The ammunition provided for them was limited, and not easily obtained;* not a round, therefore, was to be wasted. The unerring shot crashed through the Russian batteries, each one disabling a gun or destroying men and horses. Soon they began to waver. The horses were seen to move forward. Another well-directed shot plunged through them, and the artillerymen, harnessing their teams, fell back upon the edge of the hill where they had first taken up their position. But they were still within reach. Again their guns were overthrown, and tumbrils lay broken on the ground. Their fire slackened, and the heavy columns of their infantry, no longer urged onwards by it, were falling back on all sides. The Zouaves and Indigènes relentlessly pursued them. In a little while none were left on the hill facing the British lines, but the still powerful Russian artillery carried on the battle and covered the retreat. Three times were the entire detachments which worked the two English guns mown down before the enemy's fire completely ceased and their last ammunition waggon had disappeared over the crest of the hill, leaving in one spot a heap of dead, sixty-eight horses, six entire and several broken tumbrils, and the shattered remains of several gun-carriages. But no gun had been abandoned. By extraordinary exertions the Russian artillerymen had, as usual, prevented any such trophy falling into our hands.

The battle was now won. A heavy fire from the town and ships still covered the retreat of the Russians. Lord

* It will appear scarcely credible that these highly useful guns had been supplied from England with only 120 rounds of ammunition each.

Raglan,

Raglan, Generals Canrobert and Bosquet, surrounded by the officers of their staff, advanced to the edge of the cliff beneath the two-gun battery. Long before they reached the spot they dismounted, for no horse could tread there on that day. A heap of dead and dying, perhaps more dreadful than ever field of battle had shown before, encumbered the ground. On a small plain beneath, on the opposite side of the river, were gathered together the thousands which had been driven from the heights. Broken columns were hurrying in utter disorder over the narrow causeway which crossed the marshy valley, although there were none to pursue. A French battery advanced at full speed to the edge of the overhanging height, and poured its fire upon the panic-stricken crowd. It reeled to and fro, and then breaking up, the hill sides and the ravines were covered with flying men. No army had ever made a more disgraceful retreat! Before nightfall not a remnant of the mighty host which had that morning been led to battle could be seen.

Whilst the battle was raging on the heights in front of the second division, a large body of infantry with artillery, under General Soimonoff, attempted to turn our flank by ascending the valley to the right of the five-gun battery; but they gave way before the steady and well-directed fire of a small body of Marines, and of the first brigade of the light division under General Codrington. At the same time a sortie was made upon the extreme left of the French lines. About 5000 men issuing from the town under cover of the mist, surprised and entered two batteries; but they did not long hold them. General Forey, who commanded the division attached to the siege operations, quickly advanced. The Russians were driven back in disorder and with great loss. General de Lourmel, carried away by the ardour of the pursuit, fell mortally wounded under the very walls of the town. In him the French army lost a leader renowned for his chivalrous bravery.

Such was the battle of Inkerman, one of the most memorable in the annals of war. For nearly seven hours 8000 English and 6000 French soldiers sustained a hand-to-hand fight against nearly 60,000 men, supported by artillery vastly superior in number and calibre to any that could be opposed to them. Upon the issue of the struggle depended the very existence of the allied armies. Had the Russians succeeded in their attempt, the prophecy of their commander might have been fulfilled—their enemy would have perished by the sword or have been driven into the sea.

Again in this instance an admirably planned attack was ill executed. It owed its failure principally to two causes: the want



want of vigour in the attempt of General Soimonoff to turn the flank of the 2nd division by ascending the valley leading up to the five-gun battery, and the unskilful manner in which General Liprandi executed his ill-concealed feint. But it is principally to the latter cause that the complete defeat of the Russians must be attributed. Had the attack upon Balaklava and our rear been sufficiently persevered in, General Bosquet could not have moved his battalions to the assistance of the English. Without this aid, our troops could not have maintained their ground against the vastly superior numbers brought against them. The Russians, encouraged by the presence of the sons of their Emperor, blessed by their priests before entering into battle, and drunk with religious enthusiasm and strong drink, rushed with blind fury upon our troops. The foremost columns, when once engaged in the struggle, could scarcely fall back; there was no space for them to deploy, and the thick brushwood impeded their movements. Masses after masses of men pressed up the hill-sides, pushing onwards those that were in front, and leaving no room for retreat. Upon these dense crowds the Minié told with fatal effect, and when once they were broken, the most complete confusion ensued. Hence the terrible slaughter in the Russian ranks. The excitement of a first success having subsided, they rapidly gave way and fled panic-stricken before the impetuous and repeated charges of the French and English troops. Their artillery was well served, and inflicted great loss upon the allies. But again the fear of leaving a trophy made the gunners uncertain in their movements, and induced them to retire too soon. More than once the horses were led to the guns whilst the issue of the struggle was still doubtful. Colonel Dickson well divined the best mode of defeating the enemy, when, neglecting the columns of men, he directed his round shot upon their guns. The artillery once silenced or hesitating, the Russian infantry no longer fought with confidence, but soon fell back in disorder.

The British troops fought on this day with a calm and steady courage that has never been surpassed. Led on by their regimental officers, they charged over and over again the massive columns of the enemy, and drove them back with the bayonet. When, without ammunition, and borne down by overpowering numbers, they were compelled to retire, they formed again as soon as they were out of fire, and rushed once more into the fray. We owe our preservation to the indomitable courage and heroic conduct of the soldier; and well, therefore, was Inkerman called by one consent on the field 'the soldiers' victory.'

The imminent danger we had incurred on the 5th November

opened the eyes of the nation to the precarious position of the allied armies, and to the desperate nature of the enterprise in which we were engaged. No longer the besiegers but the besieged, with a force nearly twice as great as our own upon our flank, a fortress of enormous strength and an arsenal with unlimited resources in our front, and reinforcements and supplies pouring into a place which we were unable to invest—it was only by enormous exertion that we could continue to hold the ground we had occupied. When the time had almost passed, Ministers began to make their efforts, and it may be hoped that after all the sacrifices we have made we may succeed in our object.

The unexpected resistance which they had met on the heights of Inkerman almost paralysed the Russians. They made one more attempt upon Balaklava. From a hill commanding the height occupied by the Marines they opened an ineffectual fire of field-pieces. The day after, a crowd was seen dragging a siege-gun of large size up the precipitous ascent. It had nearly reached the summit, when the weight, overpowering men and horse, hurled them down into the ravine beneath. With these exceptions, and occasional sorties, principally directed against the French batteries, and all vigorously repulsed, the Russians have not again ventured upon an attack. The allied armies, at the same time, have remained on the defensive; each satisfied to hold their position until fresh reinforcements of men, and fresh supplies of the munitions of war, should enable them to recommence the siege with some prospect of success.

The approach of the stormy season further disclosed the neglect and improvidence in the Government, and the gross negligence and incompetency of the departments to which the details and conduct of the war had been confided. Our army was left without adequate clothing to protect them from the inclemency of the weather; with scarce sufficient food to sustain them; and without an adequate medical staff to care for those who were wounded in battle, or disabled by sickness brought on by the privations and sufferings to which they were exposed. From the absence of the means of transport and the want of a proper road, the operations of the siege have been paralyzed, our horses have been destroyed, the supplies, which might have preserved the healths and contributed to the comforts of the soldier, have been allowed to rot, and the sick have been left exposed to wet and cold in miserable tents * at Balaklava. The

* It will scarcely be credited that many of the tents sent out with the army were used in the Peninsular war. It need hardly be added that they afforded no protection whatever.

French,



French, more provident than ourselves, had foreseen the difficulties and unavoidable sufferings of a winter campaign. They had constructed roads between their lines and the place of disembarkation, and had moreover made depots for the commissariat in their camp, anticipating the possibility of a temporary interruption, from weather or other causes, of communication with the harbour: provisions for the men or provender for the horses have thus been at all times at hand. Large substantial sheds of wood were easily built for their sick and wounded, and afforded them effectual protection until they could be removed to Constantinople, where well ordered and well provisioned hospitals, furnished with all that humanity and medical skill could devise, were ready to receive them. Their shipping in Kamish Bay has been admirably managed; and although greatly inferior to ours in tonnage and in size, has never failed to furnish them with necessary supplies, whilst proper and well-enforced regulations have prevented confusion and preserved a commodious and unencumbered landing-place in the harbour. Contrast the condition of our army, and the management of the department connected with it, with that of our allies; the state of our roads, the sufferings of our sick, the harbour and town of Balaklava, our hospitals at Scutari, and the unparalleled sufferings of our men and animals! As in all the naval movements we have hitherto been behind them, so in all that tends to the efficiency and comfort of the soldier, we have shown ourselves infinitely their inferiors. These are humiliating reflections, and still more painful when it is remembered that they are caused by our own want of common foresight, and our obstinate determination to reject every warning and every counsel.

Before we conclude, we cannot but refer to the ready and truly considerate manner in which General Canrobert and his officers have assisted us in our wants. By his willingness to afford at all times that aid which our own negligence and imprudence have compelled us to seek at his hands, no less than by his eminent qualities as a commander, and the generous way in which he has always borne testimony to the courage and conduct of our troops, he has gained the confidence and esteem of our army, and has strengthened that bond of union which now exists between the two nations.

By the end of the year the allies, after extraordinary exertions, were, it would appear, in a condition to commence a second attack upon Sebastopol, and possibly, at the time we are writing, that event has actually occurred. We devoutly hope that it may prove successful. Indeed we can scarcely doubt that if our pre-

 parations

parations and resources are such as we are informed they are, the *south side* of the place must succumb before our fire and a subsequent assault. But we must be prepared for a heavy loss and for further difficulties. Whatever may be the result of this expedition—whether the fall of Sebastopol be but the first event in a long and bloody war, or whether the nation suffers a hollow and uncertain peace to be concluded, utterly inconsistent with the vast sacrifices it has made—the future historian of the campaign in the Crimea will record with mingled feelings the indomitable courage and long suffering of an English army,—the incapacity and neglect of an English Ministry,—and the generous forbearance and noble spirit of the English people.

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ART. IX.—*Corsica.* By Ferdinand Gregorovius. Stuttgart and Tübingen. 1854.

FEW countries at all within the pale of civilization have been so little frequented and described by travellers as Corsica. Accessible by its position, magnificent in its scenery, remarkable for the moral peculiarities of its inhabitants, the birth-place of Napoleon, it has claims alike upon the pen and pencil which have hardly yet been recognized by any master of either competent to do them justice. We doubt not that the British Museum contains works from which very ample information may be derived on the subject, but we know of none—at least, in English—which, since Boswell's time, has attained notoriety. Though we cannot venture to assert that no one of the enterprising artists in the service of the Illustrated News has dashed off a woodcut of some picturesque feature of the island, some spell would seem to have protected it alike from the tourist, the book-maker, and such visitants as Stanfield, Roberts, and others, who on steel or stone have made so many glorious scenes accessible and familiar to sedentary men of moderate incomes. Other islands of the Mediterranean have fared better. We have explored, for instance, well pleased with Mr. Tyndal, those strange and unaccountable remains of antiquity, the round towers, which in Sardinia attract and puzzle the erudite. Corsica, indeed, does not abound in remains of classical or more remote antiquity; but, these apart, is far richer in materials for the pencil of the artist or the pen of the historian than its immediate neighbour. We can hardly account for this neglect. Corsica would certainly not be a judicious selection for a bridal tour; Brown, Jones, and Robinson might



might encounter there privations and inconveniences to which even the Procrustean beds and scanty toilette apparatus of Rhineland inns would have failed to inure them. To Englishmen, however, in pursuit of novelty, excitement, or instruction—in an age when newspaper correspondents fling themselves into besieged towns and join in pitched battles—such difficulties as these are not worth mention. It is true that an unhappy reputation attaches to the Corsican for making free with the life of his fellow-man, and never was a reputation better founded. Still this peculiarity presents no just cause of hesitation to the traveller. The Corsican forest swarms with bandits; but the term implies there something different from its usual acceptation in Italy. It designates not a highway robber, but a man who, having attempted or committed murder, has fled to the mountain. That he may sometimes degenerate into the former character is probable, but we have no reason to suppose that an unoffending stranger is exposed to danger in Corsica equal to that which is daily encountered in Spain, and occasionally in parts of frequented Italy. The tourist must be very unlucky, or very imprudent, who makes himself obnoxious to the bloody code of the *Vendetta*.

Those who tread in the footsteps of Mr. Gregorovius, who eloquently vindicates the claims of the island to public notice and regard, will find in his volume little instruction for their guidance as to accommodation, diet, or conveyance. Mr. Murray must procure the materials for an eventual handbook by messengers of his own. To make up for these deficiencies Mr. Gregorovius is a diligent and enthusiastic collector of the traditions of an heroic race, a man of strong feeling for the great and beautiful, and an able historian. His preliminary sketch of the history of Corsica we consider a production of the highest order, though we are not disposed to overrate the relative importance of this portion of his subject. We bear in mind that this island, the poor and rugged nurse of a very savage progeny, never, like Greece, exercised an influence on the world disproportioned to its extent and material resources. The narrative of its fortunes from its earliest records is a somewhat monotonous tale of war and violence; but we cannot forget that the blood of its inhabitants flowed through centuries in a perpetual struggle for national independence with a series of unscrupulous invaders—the Moor, the Spaniard, the Pisan, the Genoese (who were the worst of all), the German mercenary, and the Frenchman. The history of Corsica is a long tragedy acted on a minor theatre, but very many of the actors were worthy of a more splendid

stage

stage and a larger audience. Few have attained the notoriety which great deeds and high motives well deserve. Napoleon is scarcely to be considered an exception; for though the native disposition is to be traced in his character, and his military career commenced in the island which gave him birth, his fame is little connected with it. Those of whom we now speak lived and died for Corsica, and Paoli is perhaps the only one whose name has been made familiar to our ears. Even he is best known to Englishmen as the object of one of Boswell's idolatries.

Among the earliest writers who make any mention of Corsica are Seneca, Diodorus, and Strabo. The descriptions of Seneca, both as regards the inhabitants and the natural features of his place of banishment, are tinged with the ill-humour of the exile. Diodorus is more indulgent, probably more just: he is at issue with Strabo as to the character of the Corsican slave, defamed by the latter as sullen, obstinate, and a bad bargain. He notices, as universal in the island, the quality of strict respect for property, which our author asserts to be equally predicable of the peasant of the present day. The spoils of the bee belonged, without dispute, to the first finder. The sheep marked with the owner's symbol required no guardian. One curious custom Diodorus mentions, identical with one which early North American travellers attribute to certain tribes of Red Indians. During child-birth the mother was neglected, but the father took to his bed, surrounded by relatives, and went through all the forms of helpless sickness for a day.

A spirit of resistance to domestic as well as foreign tyranny was early rife in Corsica, which, if her coasts had been less accessible to invasion, might have made her an insular Switzerland, and a depositary of settled free institutions in times when they were scarcely known in Europe. The island, however, at all times appears to have possessed a sort of magnetic attraction for the armed adventurers of many countries, both Christian and Mussulman. Here indeed, as elsewhere, the noble, in his fortified stronghold, long maintained a struggle for power, which he abused; but at no time was serfdom acknowledged as an institution in Corsica. The first of a long list of heroes and martyrs, of whom there is any credible account, was Sambuccuccio, who in the early part of the eleventh century overthrew the baronial oppressors, headed by the Lord of Cinarra. He is famous for the establishment of an elaborate system of free territorial institutions, of which the traces still remain in the designation Terra del Commune appended to the district between



between Alexia and Calvi. The following is our author's account of Sambuccuccio's plan:—

'After his victory over Cinarra he established a rural league or confederation, similar to that founded, under analogous circumstances but much later, by the Swiss mountaineers. All the country, within a circuit embracing Alexia, Calvi, and Brando, united itself in a free community, and took the designation Terra del Commune, which it still retains. The structure of this union, simple and purely democratic, was regulated by the natural demarcations of the country; for the land was, by its system of mountains, distributed into separate valleys like the cells of a spider's web. All the hamlets of one valley were united into a parochial district, still bearing the Italian title, which it has borne from the remotest times, of *pieve* (plebs). Each pieve embraced a certain number of communes or hamlets (paese). Each commune next chose, in assembly held before the church, a podesta and two or more fathers of the commune, probably from the first, and certainly later, for one year. It was the duty of these fathers, in accordance with their titles, to exercise parental care over the welfare of the commune, to keep the peace, and protect the weak. They met and named a particular official called "caporale," who seems to have discharged the functions of a tribune of the people, and was specially charged with the maintenance of popular rights. The podestas again met and chose the *dodici*, or council of twelve, the highest legislative body of the confederation. . . . . These seeds of a free polity were never stifled; they maintained at all times a love of country scarcely paralleled, and an heroic spirit of liberty which made it possible for Corsica, at a time when the principal civilized communities of Europe were still under the yoke of despotic institutions, to exhibit the pattern of the democratic constitution realized by Pasquale Paoli, which arose before America had won her freedom, or France had undergone her revolution.'

The victory over the nobles, on which this constitution was founded, was in itself no slight achievement. Few, if any, of these baronial tyrants were of native origin. They sprung, for the most part, from Italian adventurers, who since the year 713, when the island was first invaded by the Saracens, had waged war against the infidel on this theatre of action, and had won, in return for such service, or by force of arms, fiefs and dignities. To meet their growing influence, Corsica had none of those aggregations of commercial or manufacturing industry which on the mainland more than balanced the power of the feudal aristocracy. The rude and scattered peasantry had here a harder task, which, under Sambuccuccio, it brought to a successful issue.

We cannot follow our author step by step through his narrative, condensed and pregnant as it is, of resistance to invasion and tyranny. Its salient points are bright, its episodes are

are of romantic interest, but the page is unavoidably 'too much smeared with blood and dust' to invite transcription. Of all the oppressors under whom the island groaned, the Genoese were the most cruel, persevering, and successful. One episode of the struggle with that state we select as singularly illustrative of Corsican character. It concerns the life and adventures of Sampiero, a leader and hero of the sixteenth century. This extraordinary man was born A.D. 1498, in Bastelica, a village in the mountains near Aiaccio. Of obscure parentage and small means, like many of his countrymen in that day, he migrated in early youth, in search of military employment, to Italy. In the service of the Cardinal Hippolite de Medici he quickly rose to eminence as leader of the corps of Condottieri, known in Italian chronicles by the ominous name of the Black Band of Florence. He next found a wider field for his talents in the army of Francis I., in which he commanded a regiment of his countrymen. He became the friend of Bayard; and Charles of Bourbon was wont to say of him, that the Corsican colonel on a day of battle was worth 10,000 men. While thus acquiring distinction in foreign countries, he was not unmindful of his own. He returned home in 1597, and his reputation as a soldier supplying the place of titles and ancestry, won for him a noble bride, Vannina, daughter and heiress of Francis Ornano, a principal noble of the island. The Genoese, who were at this time in possession of the larger portion of it, had taken part against France in the great contest between that power and Charles V. The Genoese governor of Bastelica considered the soldier of Francis lawful prize. Sampiero was waylaid and flung into a dungeon of the citadel. Rescued by the influence of his father-in-law, he treasured up the wrong, and devoted his life to revenge it.

> The first love (says a French dramatist) of a woman of Aiaccio
> Is like the strong hate of Aiaccio's men,
> And Ætna's central fire a type of either.'

Corsican history affords ample illustration of the truth of both these assertions, and that of Sampiero specially confirms the second. We find him shortly after his liberation actively instigating Henry II. of France to the expulsion of the Genoese from the island. In 1553 a combined French and Turkish fleet, the latter under the famous corsair Dragut, with Sampiero and many other refugees on board, effected a landing near Bastia. The name of Sampiero roused the native population everywhere to arms. In a short time the Genoese were driven out from every stronghold in the island, with the exception of Calvi and Bonifazio. The latter, after a splendid resistance to the Turk, was induced by stratagem to surrender, and Sampiero with difficulty saved a few of its inhabitants from the perfidious and unsparing vengeance of Dragut. Calvi still held out, and to save this last position, Andreas Doria, at the age of eighty-six, unfurled in the cathedral of Genoa the banner of the state, and conducted a strong expedition to the gulph of San Fiorenzo. The old man's skill soon turned the tide of success, the more easily as Sampiero had quarrelled with De Thermes the French commander, and had gone to France to counteract the intrigues of the French camp. His return revived the struggle. His absence was defeat, his presence victory. While wounds detained him from the field, the Genoese captain, Spinola, defeated the patriots at Morosiglia. When he recovered and resumed his command, a bloody overthrow of Spaniards and Germans at the Col di Tenda was the consequence. For four years from the date of this battle (1554), the struggle continued with obstinacy, but with such a preponderance of success on the side of France and Corsica, that it required only a little perseverance on the part of the former to bring about that annexation of the island to her powerful protector, and that political separation from the Italian stem to which by origin and language she belongs, which has since been effected. The peace of Cateau Cambresis in 1559 destroyed this prospect.—'Ibi omnis effusus labor.'—By one of its stipulations Corsica was abandoned to its worst enemy, Genoa. A groan of despair rose from the island, but despair was a word unknown to the vocabulary of Sampiero. For four years he wandered through the world soliciting aid from France and various courts of Italy. Failing in every Christian quarter, he betook himself to Barbarossa, at Algiers, and to Sultan Soliman, in Constantinople. The Genoese tracked his movements with ceaseless anxiety; snares were laid for his life without success; and the crafty senators devised a subtler scheme for striking at him through his best affections and neutralizing his patriotism by destroying his happiness as a husband and a father. During Sampiero's wanderings, his wife Vannina was living at Marseilles under French protection. Her eldest son Alfonso was at the French court, the younger, Antonio, with herself. Genoese spies and emissaries thronged around her. Among them was a priest, by name Ombrone, employed as tutor to the boy, and high in her confidence. This man and a subtle confederate unceasingly dinned in her ears the sad prospect to her husband, herself, and their issue, of a continuance of the struggle with Genoa. By taking refuge in that city, she would obtain at once the restoration of her children to a rich, ancestral inheritance,

inheritance, and the reconciliation of her husband himself with the republic would follow. He had toiled and suffered sufficiently for treacherous allies and a thankless country, and their latter years would be passed in the enjoyment of wealth, honours, and domestic happiness. She yielded, and prepared for flight. Before, however, she could execute the scheme, intelligence reached Sampiero, then at Algiers, of her intentions. His first impulse was to sail for Marseilles, but he was on the point of accepting the important invitation of Soliman to Constantinople, and he decided to send in his stead a tried friend, Antonio di San Fiorenzo. Antonio arriving at Marseilles, found Vannina's dwelling deserted. She had sailed only the day before for Genoa. He collected hastily a band of Corsicans, flung himself into a galley, and coming up with the fugitive near Antibes, arrested her in the name of the King of France. Brought back to France, she was offered the protection of a convent, but she was conscious of no failure in her love for her husband, and preferred to await his arrival and abide his resentment. Sampiero at length returned, and was met at Marseilles by Antonio and a relative, Giovanni di Calvi. In the conversation which ensued, the latter unadvisedly let fall that he had long suspected Vannina's intentions. 'And you were silent,' replied Sampiero, and stabbed him on the spot. Sampiero then took horse and galloped to Aix, where his wife awaited his arrival in the castle of Zaist. Arriving after nightfall, he remained under the walls of the castle till morning. He then entered and summoned Vannina to accompany him to Marseilles. No word was spoken by him on the gloomy journey, no intention was announced by him; and friends who knew their former affection, still hoped for a reconciliation. When, however, he crossed the threshold of his abandoned home, the demon woke up within him at the desolate aspect, and he stabbed the wretched woman to the heart. Her obsequies were sumptuous. A Corsican chronicler says he loved her passionately, but his love was Corsican. We have given this narrative at some length, for it supplies the place of a host of illustrations of native character which might be gathered from the volume before us.

The remainder of Sampiero's life was one struggle with Genoa, principally maintained on his own resources. The court of France, though it took no pedantic objection to the murder of Vannina, kept aloof from Corsican affairs. The Genoese were principally led by Stephen Doria, who advocated towards Corsica that policy which Athens carried out towards Melos, the massacre of the entire adult population. The name of Napoleon occurs for the first time in history as one of Sampiero's brave but



but unsuccessful adherents. At last, in 1567, the Genoese succeeded in ridding themselves of their indomitable enemy. He fell into an ambuscade contrived and executed, as poetical justice demanded, by three brothers of the Ornano family, with whom the obligations of the Corsican Vendetta were stronger than the claims of their country. He died like a boar at bay, fighting to the last, and with his dying breath exhorting his son Alphonso to fly and reserve himself to revenge his father's death.

It would not be easy for a writer in the United States of America, however enamoured of republican manners and principles, to omit all notice of the institution of slavery. A treatise on Spanish history would be incomplete without some allusion to the inquisition. Corsica can boast of a system of self-inflicted torment, a misery which, though not, like these, incorporated into the written law, may take rank with either as an institution of the country. The unwritten code of the Vendetta has for centuries been the scourge and disgrace of the island. It was during the struggle of the sixteenth century that Sampiero's French ally, De Thermes, introduced into the island the firelock, a weapon which was ever after a ready instrument of lawless revenge. The habit of bearing arms of any kind engenders their abuse, but a deadly missile is a far more pernicious companion than a weapon like the knife, which requires proximity, some strength, and resolution for its effective use. A native historian calculates the assassinations committed between the years 1359 and 1729 at 333,000, but he also does the skill of his countrymen what we consider the injustice of supposing that the wounded who escaped with life may have amounted to as many more. We may question these figures, but the authority of Fillipini leaves us no reason to doubt that in his time the accomplished murders averaged 1000 per annum, and it is known that in thirty-two years of Genoese government, from 1653 to 1714, those recorded amounted to 28,715, and this in a population of 140,000. In many of these years there was not a single legal condemnation for the offence, if such it was reckoned. From 1831 to 1837 the administration of French law, aided by an active armed police, troops, and the guillotine, had reduced the annual average to 156, in a population of 260,000. In 1840 it had descended to 86. Yet even during these better times a man has lived for fifteen years without daring to cross the threshold of his barricaded house, and on leaving it after that interval has been shot down at his door. The possession of firearms is now strictly forbidden, and not a gun remains in the island. The prohibition has

has been popular with all but sportsmen, for the natives find the advantage of being relieved from the terrible effects of their vindictive customs.

The Corsican practice appears to resemble in some respects, and to differ in others, from the system of assassination which in disturbed times and particular districts has occasionally been a disgrace of Ireland. We are not aware that in Corsica a man himself unconcerned in a feud can be hired, as such often have been in Ireland, to execute sentence on a victim. The Corsican revenges his own wrong or that of his clansman or forefather. On the other hand, like the Irish peasant, he has no feud with the functionaries of the law. The latter does not waylay the judge or the counsel on their way to Clonmel, though he well knows the object of their journey is the death of his near relation on the gallows. Neither are the armed police or military in either country, though frequently objects of bloody resistance, objects of Vendetta. In Corsica the gens-d'arme, who in fair fight has shot down or captured a criminal, pursues his functions afterwards without fear of vengeance. A wild sense of justice would seem in both countries to protect the man who has not overstepped the line of his acknowledged duties, or acted from private malice.

We might puzzle ourselves with a speculation on the value of prolonged existence under such conditions. We lean to the conclusion that it would be better to go out in the street and be shot. We can conceive at least nothing more doleful than the existence of a man destitute of literary resources thus incarcerated, in a state of society in which the arts of social intercourse are little cultivated, and with the sole resource of a dirge sung by his daughter in the evening. Health under such circumstances must become a curse, and fine weather seen through the loopholes of such a retreat a bitter aggravation.

Benevolent functionaries have exhausted in vain all endeavours to procure the reconciliation of families between whom a blood-feud of centuries had existed. In one of these instances an amiable Prefect had succeeded in bringing two together at a festival. It went off to all appearance well, but when the Prefect interrogated a patriarch of the village as to his opinion of the result, the old man shook his head. They met again in the morning, and the old man's face was cheerful. It appeared that a fray had occurred on the return home of the guests, and that a young man had been shot, whose death exactly balanced an account of mutual homicide. It has been found necessary to exempt a family from taxes, because an order had been issued by



by an influential bandit that no rents should be paid them. This occurred in the town of Sartene, where the municipality was also forbidden to use as a town-hall a house belonging to the Quillichini, the family under ban. The authorities after full discussion obeyed. A French writer, from whom we learn some of these details, records another occurrence in which religious feeling plays its part, for it must be borne in mind that the Corsican is a sound and rigid Roman Catholic. A priest had been detected in betraying the confidence attached to his function, and the honour of a family called for vengeance. The direct assassination of a priest was however not to be thought of. It was ascertained that his guilty rendezvous was attained by a nocturnal ride along a narrow mule-track on the edge of a precipice. A mule was flayed, and the fresh skin, with the inner surface upwards, placed on a critical passage of the track. The priest's mule, as was intended, lost its footing on the slippery snare, and rider and mule were found dead together in the abyss below. Our author's first greeting, upon landing on the quay of Bastia, was an account of a recent murder. Two days later his morning walk on the beautiful marine parade of that city was arrested by the aspect of the guillotine. The ghastly spectacle is explained in the following dialogue:—

'Who is to suffer?

'The Braccia mozzo. The man with the lame arm. He is twenty-three years of age. The Sbirri have taken him in the mountains. He defended himself like a devil. They broke his arm for him. It has been cut off and he is well.

'What has he done?

'Dio mio. He has killed ten people.

'Ten human lives! and from what motive?

'From capriccio.'

But this instance is not to be put strictly to the account of the Vendetta. The young criminal, without an injury to revenge, acted from the ambition which has led English apprentices to emulate Macheath and Jack Shephard. He had admired a famous bandit, and to qualify himself for similar eminence, committed a murder and took to the *macchio* or bush. In a state of society like that of Corsica, the best qualities degenerate into the worst vices. The Vendetta is closely connected with the love of family, which in the Corsican is only equalled in intensity by that of country, and is especially conspicuous in the fraternal relation. The island poetry is for the most part a dirge, a song of grief and vengeance for one who has died by violence. The words are usually put into the mouth of a sister, but even the widow in the climax of her grief often speaks

speaks of the departed as her brother. These female minstrels, and the female sex in general, have much to answer for in fostering and exasperating the spirit of relentless vengeance. The widow hangs up in the ancestral hall the clothes in which her husband fell, that her children may contemplate the rent of the knife or the perforation of the ball in the homespun brown cloth, or she sews a strip of the blood-stained linen into her son's garment as a memento of his duty to the dead. It is thus that in Borneo the women are the great obstacles to the noble efforts of Sir James Brooke, and one of the best of God's messengers on earth, the Rev. Mr. M'Dougall, for abolishing the strange practice of head-hunting. The plea of the young man, 'How am I to get a wife?' is difficult to answer. The most salutary operation of the Vendetta occurs when two bandits, standing under its relations to one another, take to the macchio in the same district. The Scotch proverb, 'Hawks will not pick out hawks' een,' is then reversed, and society is sometimes relieved on the homœopathic principle, *similia similibus curantur*.

Enough has perhaps been said to show that the story of Corsica is not a 'conte pour rire.' In one instance, indeed, the wildest romance of its history degenerates into the ludicrous. In 1736, at a moment when Genoa, assisted by Austria, was straining every nerve to quell the last embers of resistance, a ship, under English colours, anchored near Alexia. Some succours had been already received from private English sources, and the populace crowded down to the shore in expectation of further supplies of ammunition. They met on the beach a figure such as Bartholomew fair alone could match. A man of majestic gait and stature, dressed in an Eastern caftan of scarlet silk, Moorish trowsers, and yellow slippers; on his head a voluminous wig of the day, upon the wig a Spanish hat and feathers; a sceptral staff in his hand, pistols in his girdle, and a cavalry sabre trailing at his heels. This description, which is authenticated by engravings of the time, reminds us of the stage direction for the entry of Dorax in a famous scene of Dryden's play 'Don Sebastian:'—'Enter Dorax, having taken off his turban and put on a peruke, hat, and cravat.' This strange vision was the Westphalian Baron Theodore von Neuhoff, a ruined gambler, who had formed, with much deliberation, and now for a while carried out with spirit and success, the strange conception of making himself king of Corsica. A mountebank, but no common one, he had been intimate with kindred spirits of his day of greater mark, Alberoni, Law, and Ripperda. He came not empty-handed. The ship which conveyed him was heavily laden with warlike stores, and even with considerable sums in hard coin. This



This quantum of material aid, eked out with unbounded promises and pretensions, had instant success. Public opinion was unanimous and enthusiastic. Few elected sovereigns have been more fairly called to a throne than Theodore the first, and last, of Corsica. He threw off with great spirit: offices, titles, and decorations were invented and distributed with a broadcast profusion, which would have stocked a court of Versailles or Madrid with chamberlains and dignitaries. He is said, however, at the same time to have been unsparing of his person both in council and the field, and to have answered the Genoese proclamations not only with much force and logic on paper, but with some hard blows in battle. Thorns, however, soon sprung up in the crown of oak-leaves, which a wise economy had substituted for more expensive regalia. A party, called the Indifferents, was formed, which was joined by his own prime minister, Hyacinth, father of the famous Paoli. After eight months of government, Theodore assembled his parliament to announce the necessity of his departure in search of reinforcements. With royal solicitude he appointed a regency of three grandees, to be assisted by no less than twenty-seven counts and barons of his own creation; and, embarking at Sartene, laid aside his theatrical attire, and landed at Leghorn in the disguise of an abbé. Within two years the indomitable adventurer reappeared, and this time with three large ships of war and supplies, which in the first instance might have sufficed to drive the Genoese from the island. Circumstances, however, had changed; more powerful invaders, the French, had meanwhile obtained a footing on the island, and this attempt, and a third, were totally unsuccessful. The close of the clever adventurer's career may be traced in the pages of Peregrine Pickle, in which Smollet's readers will find him a prisoner for debt in the St. Helena of a London gaol. Walpole headed a subscription for his relief. He died in 1756, in London.

The churchyard of St. Pancras, in that city, contains the dust of one who, with reference to everything but final success and the relative extent of his theatre of action, well deserves the name of great, Pasquale Paoli, the Washington of Corsica. Our limits forbid us to do any justice to his pure and noble career and character. It is enough to state that the free constitution which he devised and organized for his country anticipated by nearly twenty years that of the United States; and that among the first objects of his life were the suppression of the Vendetta and the education of his countrymen. It must be admitted that the principal objects of Boswell's idolatry were well selected.

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place and home of Paoli. It was here that, when he was expected from Naples to take the chief command in Corsica, his brother Clement fitted the windows with glass for his reception. Pasquale condemned the luxurious innovation by smashing them with his cane. Some may consider that this exploit savoured of claptrap, and that it would have been wiser in Paoli to have promoted the introduction among his countrymen of one of those appliances of civilization with respect to which Gibbon pronounces, that an English labourer enjoys a superiority over the Emperor Augustus, who had neither glass to his windows nor a shirt to his back. In these matters, however, the circumstances of the moment, and the character of an audience, make all the difference between claptrap and eloquence—between the ridiculous and the sublime. Some of Napoleon's proclamations, addressed to English soldiers, would have been bombastic failures; but they ran like fire through French ranks, and stimulated his men to great exertions and great sacrifices. These windows, which remain unglazed, command a magnificent view of the Monte Rotondo, the Mont Blanc of Corsica. Paoli's portrait, in which our author traces a striking likeness to Alfieri, hangs here in the room in which, in 1724, he was born. His wooden chair, and the table at which he wrote, clad in the woollen peasant's jacket, and surrounded by his large dogs, are preserved to bear witness to the simplicity of his habits. Paoli never married; his only recorded intimacy with the fair sex was one, intimate and lasting, but said to have been Platonic, with a lady of the noble house of Rivarola, a nun. She was a person of superior intellect, and much of his political correspondence was addressed to her. By natural vocation Pasquale was more addicted to politics and literature than to arms. He directed public affairs with singular talent, he founded schools and universities; but his brother Clement was the soldier of the family, the Joshua and Judas Maccabeus of Corsica. Both were religious, but Clement's life was passed between the cloister and the field of battle—between the most rigid monastic observances and the fiercest exploits of arms. He fought with the rosary in one hand and the musket in the other. His skill in the use of the latter was unrivalled, and every shot he fired was accompanied by a prayer for the soul of its object. Our author remarks that, while Pasquale's prototypes may be found in Plutarch, those of Clement must be looked for in the Old Testament.

A few miles from Stretta the river Golo is spanned by the bridge of Pontenuovo, the scene of a fatal and decisive action, in which, A.D. 1769, the French, under Marboeuf, overthrew the Paolis and crushed the last effective resistance of Corsica. It is said



said that in 1790 young Napoleon passed some hours on this field in deep study of the ground. The father of Napoleon was much respected by Marbœuf, and it was to his protection, backed by that which it procured of the Duc de Biron, that young Napoleon owed his admission to the school of Brienne. It was, if we mistake not, this Duc de Biron who, by paying Rodney's debts at Paris, set him free to fight and conquer De Grasse in the West Indies, and who afterwards showed hospitality to Arthur Wellesley when a student at Angers.

It is our hope that the work of Mr. Gregorovius may obtain the compliment of translation, which we think it deserves. The chapters upon Aiaccio should be read in their integrity. We are unwilling to forestall the interest which attaches to their descriptions of the scenes of Napoleon's youth, and the anecdotes, which with great diligence their author has collected on the spot, of his Corsican education and adventures. They are pregnant with evidence of his early inclination for arms and for despotic command. One anecdote we select as new to ourselves and as favourably illustrative of his character. The last occasion on which he trod his native soil was on his return from Egypt in 1799. It was on the 29th of September in that year that he put into Aiaccio. He at first remained writing in his cabin and declined to land, but yielded to the wishes of Berthier, Eugene, Lannes, and others who desired to inspect the birthplace of their commander. A few years only had passed since he had walked those streets as a private citizen, or more proudly at the head of a militia battalion, to which he had been raised after a fierce struggle with rival factions. On one occasion a shot fired from the other side of a street had narrowly missed him. It was notorious that the hand which pulled the trigger was that of a priest. They now met and recognized each other. The priest was hastily retiring, when Napoleon overtook him and gave him his hand. Although he had landed with reluctance, he stayed six days on the island, visited the villa in which much of his youth had been passed, and stood the brunt, sometimes hard to bear, of the raptures of his nurse, on whom he afterwards bestowed a pension. The memory of Napoleon is in disrepute in Corsica for having neglected it during his greatness. The charge as regards the island is true. He showed no recollection of it in the way of endowments, monuments, or public works. From passages in that most valuable publication, his correspondence with Joseph, we infer that he had no great value for the Corsican peasant as a soldier, and he certainly valued peasants for little else. The list, however, of his countrymen whom he employed and promoted in

 various

various capacities is not inconsiderable. A companion of his earliest fortunes, Colonna, was intimate with him to the last. He was the first confidant of the projected escape from Elba, and to his care Napoleon in his will recommended his mother Letitia. Antomarchi, Napoleon's physician at St. Helena, was a Corsican; and from a Corsican priest, Vignale, subsequently assassinated in his native island, he received extreme unction.

By one early and eminent rival, Pozzo di Borgo, Napoleon was pursued through life with Corsican tenacity of hate. The diplomatist did not forget his country in his elevation to influence and wealth. He was liberal of the latter to local institutions, and a splendid edition of the Corsican historian Filippini was published at his expense. These good deeds did not protect his nephew from the Vendetta, which was said to have been justly incurred. He was dragged from his carriage at noonday, near Aiaccio, and shot by a relative of a girl whom he had seduced.

The commercial policy of France towards the island appears to be based on the detestable principles which formerly governed that of England towards Ireland, and to be as effective in depressing industry and encouraging the natural indolence of the inhabitants. The wines of France, for instance, are admitted duty free, while those of Corsica and other products, such as tobacco, are contraband in France. We may well credit our author's assertion that fifty-eight years of French domination, however preferable in many respects to that of Genoa, has not reconciled Corsica to her present rulers. Still less has it produced any assimilation between the two uncongenial races which it has brought into contact; the stern and melancholy islander, sparing of the beautiful language which he speaks with great purity, and the lively and voluble Frenchman who pines for the cafés of Paris, like Seneca, detests the savage beauties of nature, and considers Corsica an abode of penal exile. The memory of Napoleon is honoured in one sense as that of the man who overthrew the power and liberties of Genoa and subjugated France; but if our author is to be believed, Paoli is, as he deserves to be, the hero of the island, and his defeat at Ponte Nuovo, to native apprehension, the darkest spot on the page of her annals.

Corsica, like England, has contributed one occupant to the papal chair, Pope Formosus of the ninth century. In the sixteenth century, one Lazzaro, a renegade from Bastia, became Dey of Algiers. In the present a Corsican woman has been Empress of Morocco. One of Napoleon's ablest and most respected generals, Sebastiani, was his fellow countryman, as was



was Casa Bianca, who, with his boy, stood and perished on the burning deck of the Orient. Upon the road which leads from Bastia to San Fiorenzo, Bernadotte worked as a common soldier, and thought it high promotion to be made a corporal and direct the manual toil of others. Here, too, he fell in love with a peasant beauty of Carolo. She who might have been a queen, was pointed out to our author engaged in the Homeric occupation of carrying water on her head from the public fountain. Calvi still asserts a claim to have been the birthplace of Columbus. The Genoese extraction of the family is admitted, but it is maintained that it was here that it had settled. Napoleon while at Elba directed some inquiries into this matter. There is a Colombo street in Calvi, and some inhabitants of the name, and a tradition that men of Calvi were the first Corsicans who sailed for America. It is affirmed that the Genoese seized and suppressed the archives of the family. In Corte flourished the Cervinis, a race of gallant men. One of these, Thomas, though at feud with Paoli, rescued the latter when besieged in the convent of Alando. His son was Napoleon's companion-in-arms at Toulon. He became commandant of Rome, was the terror of the Pope, and, as good Catholics may fairly assume, expiated his unceremonious behaviour in losing his head by a cannon-shot at Ratisbon.

The atmosphere of Corsica has not been one in which literature, art, or science, could be expected to flourish. The periodical press of the island now produces two weekly newspapers, one published in Bastia, the other in Aiaccio. A library of 16,000 volumes exists in Bastia, in a building formerly occupied by the Jesuits, who founded the collection. Our author furnishes a list of names of recent local literary reputation, principally for works on history and jurisprudence. Of these, Gregori, a Bastian, who died in 1852, president of the Lyons Academy of Sciences, appears to have been the most eminent. He left an unfinished work on Corsican history, and superintended an edition of the Corsican Thucydides, Filippini. This classic work, which consists of a history and description of the island, in thirteen books, was published in 1594. The last four of these books are exclusively his own; the preceding are avowedly a compilation from several older writers. At Vescovato the house is shown in which he resided as archdeacon, and the vineyard in which he was wont to compose, under the protection of its ball-proof walls, for the worthy ecclesiastic and historian lived under ban of the Vendetta. The excitement of danger may perhaps have lent vigour to a Corsican pen. We doubt whether any advantage would accrue to English literature, if Mr. Hallam were to

 write

write under fear of any worse enemy than a reviewer, or if Mr. Macaulay were reduced to barricade his chambers in the Temple. The circumstance is the more remarkable, because the archdeacon waxes very wroth with an Italian writer, who accuses the Corsican of homicidal habits. 'Is there,' he writes, 'a country in the world in which a stranger is more hospitably received or travels more safely?' Three hundred years have not, as we believe, impaired the truth of this plea, which, however, with all respect, is and was no answer to the charge. Like Johnson, in Garrick's case, Filippini would not allow others to take liberties with his countrymen, but he is in other passages unsparing in his own censure of their vices, their indolence, their indulgence of revenge, their restless love of novelty, and their superstition. Seneca's distich was hardly more severe—

Prima est ulcisci lex, altera vivere raptû,
Tertia mentiri, quarta negare Deos.

The first address of Napoleon to Antomarchi, on the arrival of the latter in St. Helena, was—'Have you a copy of Filippini?'

Our author makes no pretensions to acquirements in natural science. The ample information which his volume contains, as to the geology and natural history of the island, is due to an acquaintance which he made at Bastia with an accomplished Florentine refugee and ex-colleague of Guerazzi, Francesco Marmocchi. Among other works which this gentleman has published, is a physical geography of Corsica, of which our author speaks highly. Metallic wealth appears to be denied to the near neighbour of ferruginous Elba. Its mines are few and of small account. On the other hand, in marbles, granites, and porphyries, it is inexhaustible. Climate, geographical position, and formation, are alike favourable to a rich and various vegetation, ranging from the palm and the cactus to the pines which flourish on the frontier of perpetual snow. Our author considers that nothing but more skill and industry than are now rife in Corsica, is necessary to make it a source of supply to France of many articles of West Indian produce, tobacco, cotton, sugar, and indigo. Seneca records in an epigram the non-existence of the olive in his day in the island. In dimensions and fertility the Corsican olive has now few rivals. In 1820 a census of its numbers was attempted. They were estimated at twelve millions. The date of its introduction is uncertain, but the variety most cultivated is said to have been imported by Agostino Doria. It is fruitful to the height of 4000 feet. The chesnut is productive some 2000 feet higher. The wild vegetation of Corsica is of that richly odoriferous character described in Milton's immortal lines, and which so often regales the senses of the Mediterranean navigator, as well as of him 'who now has reached Mozambique,' Napoleon at St. Helena said that he should recognize his native island by its peculiar perfume if he were transported thither blindfold.



The island is fortunate in its immunity from the wolf. The fox, however, having an undisturbed sovereignty, becomes strong and insolent, and scarcely less destructive to the flocks in the lambing season than the wolf. The mountain sheep still haunts the granite peaks of the Monte Rotondo and other summit ranges. We are not aware that it exists elsewhere in Europe, unless it should be found to co-exist with the bouquetin and chamois in the mountains of Candia. Serpents are few and harmless; but there is a spider, the bite of which is reputed dangerous and even fatal.

We cannot doubt that French rule, with all its faults, and with the manifest injustice of its fiscal regulations, has done much for Corsica. The present ruler of France, with a stroke of his pen, might do much more for the country from which he claims his descent. His intelligence and decision of character could hardly display themselves in a more graceful act than the simple admission of Corsica to the industrial and commercial privileges enjoyed by their fellow subjects of the mainland.

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Art. X.—1. *The Conduct of the War. A Speech delivered in the House of Commons on Tuesday, 12th December*, 1854. By the Right Hon. Sidney Herbert, M.P. London, 1854.

2. *The Prospects and Conduct of the War. Speech delivered in the House of Commons on December* 12, 1854. By Austen Henry Layard, Esq., M.P. for Aylesbury. London, 1854.

NEARLY two years have now elapsed since the majority of persons who had carefully investigated the Eastern question exclaimed against the blindness and apathy of the Government, against their unreasonable expectations that they could secure peace, and their want of energy in preparing for war. What had long been palpable to enlightened politicians became apparent to the entire country after the frightful hazards of the day at Inkerman; and for three or four weeks nothing was to be heard except the language of indignation and alarm. The pressing danger was removed, and the public, always far too prone to judge by events, have passed over more lightly than we can do ourselves the thoughtlessness which brought our entire army before Sebastopol to the very brink

brink of destruction. The ministers have been heard in their defence, and, singular to relate, every circumstance which they have opposed to the principal accusation is a confirmation of the charge. 'He was ready to admit,' said the Chancellor of the Exchequer, 'that what was to be expected from those entrusted with the political operations of the war, was not that they would be able to stand a minute scrutiny in every point of detail, but that their general measures should be taken to have been dictated by wisdom and prudence.' The same sentiment was uttered by other members of the Cabinet, and the question could be put upon no fairer issue; but the ground which the ministers have selected upon which to take their stand is precisely that which sinks beneath them upon the slightest pressure.

The remissness of the Government during the early part of the dispute has been forgotten in the excitement of subsequent events. Without recapitulating the numerous errors which they successively committed, it is natural to revert to the amazing inertness they manifested, now that we are feeling the effects of it. Lord Ellenborough, who has displayed throughout these transactions a singular knowledge and sagacity, stated in the second of his very able speeches on the 'Foreign Enlistment Bill' that he had warned one of her Majesty's ministers so far back as April, 1853, that war must come, for that he was convinced the Czar would never depart from his demands. In April, there were many who still indulged in the belief that the quarrel would be amicably settled; but on the 3rd of July the Russian army crossed the Pruth, and from that hour it was evident that the Czar was too deeply committed to recede. He had thrown down the gauntlet, and nothing remained for us but to take it up or submit to the aggressor. The Vienna note followed, and appeared, it is true, to promise a momentary success, which was solely due to the ambiguity of the language employed. It was an evasion, and not a settlement, of the dispute; and on the 27th of September the Porte declared war against Russia.

Ministers, said Burke, are placed upon an eminence that they may command a more extended horizon. Ours took up their position in a hollow, and, gazing upwards at the stars, indulged in dreams of serenity and peace. If their sluggishness in making those preliminary preparations which would have enforced the arguments of their diplomacy, was unwise before, it was little short of insanity when the fray between the principals had actually begun. The autumn of 1853 should obviously have been a period of superhuman exertion in raising and training levies for the field. Nor can we believe that a Cabinet of which Lord Palmerston and Lord John Russell were members—men who did not use to be



be wanting in promptitude and decision where the honour and supremacy of Great Britain were concerned—could have sat month after month with folded arms if the more far-seeing and spirited part of the Government had not been paralysed by the Arcadian policy of their chief. That Lord Aberdeen is an amiable, and, in some respects, an able and well-informed nobleman will not be denied; but of all existing politicians he was the very worst which could have been selected for an European crisis. Conciliation, which is an excellent peace-maker where all the parties are animated by motives of equity, is one of the most dangerous of qualities, unless united with invincible firmness, when dealing with the demands of unprincipled ambition. The most common—we will not say the invariable—characteristic of the foreign policy of Lord Aberdeen has been the refusal to push a threatening difference to extremities; to be content with verbal understandings when the sole security was in written pledges, or else to be satisfied to oppose remonstrance to action. In all the stages of the Eastern question up to the breaking out of the war, his life-long habit was apparent; and had not the public possessed a spirit and determination greater than his own, he would, we are convinced, have continued as he commenced—attempting to untie the knot with his fingers until the Czar had cut it with his sword. Forewarned as he was above all by the Czar's private confidence, he almost alone was not fore-armed. There might have been no great cause to complain that the efforts to secure peace had been protracted after reasonable hope had died away, if the negotiations had been accompanied by the only thing which would give them effect—a preparation for war upon an adequate scale, by land no less than by sea. But while so little activity was shown in recruiting the army, and in organising the commissariat and means of transport, that we could hardly appear to be in earnest, the imprudent language of Lord Aberdeen confirmed the impression that at the last we should rather make concessions than fight. When he touched upon the differences, he had nothing wiser or more momentous to tell than that he wished for peace! This languid iteration, puerile if it had not been mischievous, was the burden of every speech, and gave the Czar no slight ground to believe that if he pushed forward his armies, the gentle shepherd at the head of the administration would come forth to meet him bearing an olive-branch in his hand. So passed the precious months of the autumn of 1853 and the winter of 1854 away. Does any man, except the Chancellor of the Exchequer and his colleagues, think now that the inaction was 'dictated by wisdom and prudence'?

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How soon her Majesty's ministers came to see with the eyes of the rest of her Majesty's subjects does not appear, but we know now from their own declarations that they had lost all hope of peace when the Guards were embarked for Malta on the 20th of February. On the 3rd of March 15,000 additional soldiers were voted, and on the 28th war was declared. The first requisite was to provide forces for the contest, and Mr. Sidney Herbert told the House of Commons on the opening of the present session of Parliament that our troops had been so reduced by the improvident economy of successive governments, that an army had to be created.* The Duke of Newcastle acknowledged more than once during the discussion on the 'Enlistment of Foreigners Bill,' that it required six or seven months' training to make a recruit an efficient soldier. A government thus impressed with the twofold conviction that they had an army to create, and that half a year must elapse before the first recruit they enlisted would be ready for the field, would, we may take for granted, devote every energy to repair the deficiency and atone for the evil consequences of their own delay. How far this was the case may be gathered from what was said by the Duke of Newcastle during the debate on the Address. 'At the first declaration of war recruits came forward freely, but they soon relaxed, *and during the summer months they were few indeed in number—so much so as to cause very considerable anxiety on the part of the government.*' He ascribed the falling off to the then comparative stagnation at the seat of war, but no sooner was it known that the siege of Sebastopol was likely to be protracted and to afford full scope for hazardous enterprise than again the recruiting trade was in the ascendant. 'Week by week it has been progressing, until last week, I believe, we more than doubled the number of any previous week since the commencement of the war, and enrolled six or sevenfold the number which we had the power of recruiting some five or six weeks ago.' That there is some truth in this theory we do not at all question. It is actual fighting, and not marchings and countermarchings and listless encampments, which forms the attraction to men of a martial temperament. But there was, we suspect, another and less chivalrous cause at work in bringing such an unwonted crowd of recruits to the aid of the country in the week between the 3rd and the 10th of December. The Government, alarmed into unwonted exertion by the battle of Inkerman, had offered in the last week of November an augmented bounty to the militiamen who

* The Coalition Ministry were indebted to the government of Lord Derby for the militia and the war-steamers, without which the war could not have been carried on at all.



who should volunteer into the line, besides placing an ensigncy at the disposal of their commanding officer for each set of seventy-five volunteers. Ministers anticipated that their bounties and ensigncies would operate as an inducement, as well as the prospect of a stirring campaign, or they would not have proposed them. But why then did they wait till the army was imperilled and the country drained of troops to offer the stimulus of a further reward? Why did they not apply the remedy 'during the summer months, when the recruits were few indeed,' and the Government was oppressed in consequence by 'considerable anxiety?' They had engaged in a tremendous struggle, and, by their own confession, had an army to create. Was it 'wise and prudent' to let the summer months slip away without furnishing their contingent, or would it not have been more wise and more prudent to have gone on raising the bidding for recruits until men were obtained?

The militia is the grand magazine from which our active troops are replenished in war, and the Government which felt that they had an army to create did not ask leave to bring in a Bill for the embodying of this force till the 3rd of May. On the 6th of February Lord Palmerston announced that the militia force would be organized in Scotland and Ireland, and when the Duke of Newcastle is asked in the middle of December why no steps had been taken to effect in March or April an object which had been determined on in February, he answers that Parliament did not confer the power till the summer. In other words, the Ministers who had declared war, and were sensible that they had to create an army to carry it on, 'in their wisdom and prudence' allowed months to elapse before they proposed this pressing, this vital measure. Until Parliament was called together on the 12th of December there was but one method of explaining the conduct of the Government. It was supposed that they had limited their notions of a first campaign to the pitiful project of awaiting the enemy at the gates of Constantinople, and that they had been forced by the sudden retreat of the Russians and the clamours of the public to engage in schemes of unexpected magnitude. But this is an apology they have disdainfully rejected. From the very outset, we are exultingly told by the Duke of Newcastle, they had made up their minds to the attack on the Crimea. In planning the expedition they had not, moreover, been misled by the common opinion that the enemy was less formidable than was supposed before he had been foiled in the trial of arms with the Turks. Mr. Sidney Herbert claims to have been prophetic on the point. The public, he said, had chosen to assume that the Russian power was waning if not extinct,

but

but he himself, in the last session of Parliament, had been reproached for maintaining, what events had verified, that the army of the Czar would defend their country with their old tenacity. Having framed so vast a project, and being thus conscious of the array of might which would be required for its execution, they could yet put off from month to month the most essential measures for providing the very staple of war. Their excuse is their condemnation. The more they take credit for being wide awake to the danger, the more culpable they become for dozing at their post.

That the Government conception of the arduous nature of the contest was much larger than their preparation for it we readily admit; but notwithstanding their boast that they had taken an accurate measure of the crisis, there is abundant evidence that their views fell exceedingly short of the truth. The whole of the reinforcements sent out from June to the close of the year amounted, according to the Duke of Newcastle, to 20,000 men, or rather less than 3000 a-month. Of these, 12,300 were despatched in November alone, and a large proportion of them under the pressure of the alarm created by the news of the battle of Inkerman. So far was the Government from having anticipated even such a demand as this, which exhausted their reserves, that the Duke of Newcastle confesses that a considerable portion of the force consisted of imperfectly trained recruits, whom he had intended to keep back for the next campaign. Our original army was small, and it was not only gaps in the existing ranks that we had to fill up, but we had to swell our contingent to dimensions more commensurate with the resources of the country and the power of the Czar. What ideas could Ministers have framed of the colossal strength of Russia when, in furnishing 20,000 troops for this double purpose, they had to include the recruits whom they never dreamt could be wanted until the next campaign? Professional men are agreed that the entire force sent out to the Crimea is still inadequate for the siege of such a fortress as Sebastopol, and it is difficult to comprehend the infatuation which could set at defiance all the ordinary calculations of military science. Hardly any limit can be put upon the results which may accrue from occasional feats of heroism, from effects of panic, or the accidents of war; but as no ruler of a great country would place the slightest dependence upon such desperate chances unless in the extremities of despair, the data upon which the Ministers based their calculations remain an enigma to this hour.

The reinforcements they did despatch were sent out with a slowness which, but for the unparalleled exertions of our heroic army,



army, would have left every man of them a prey to the sanguinary ferocity of their brave but brutal enemies. For this the Duke of Newcastle offers a threefold excuse. He says that before the battle of Alma six or seven thousand troops were under orders to sail for the Crimea, but there were not sufficient transports at home to convey them to their destination. If the Government had no vessels in September, was it not possible to have concentrated a reserve at Malta or Gallipoli in the months of July and August?—or if they had been as sensible of the necessity of the precaution as they became after Inkerman, and had made equal exertions, might they not have collected at any moment out of our vast marine some means of carriage? It is notorious that they could; and the true cause of the negligence is to be found in the second and third apologies of the Duke. 'We did not,' he says, 'expect that a Russian army could be moved from Odessa to Sebastopol with the marvellous rapidity with which that movement was effected.' This only proves that the Czar knows how to wage war, and that the Duke of Newcastle does not. To make unwonted exertions, to execute movements with unlooked-for celerity, to bring an overwhelming force upon the enemy before he can gather together his legions to meet it, has been part of the tactics of every modern commander of eminence. The Duke of Newcastle thought that their Lordships would be surprised to hear, that by means of cars the Russian troops had been carried forty-two miles in a single day. When will the Duke on his part display an energy which will surprise the Czar? Instead of quoting the quickness of the Russian movements as an apology for the slowness of his own, he ought rather to have blushed that the enemy were so much more diligent in collecting cars than the English Minister of War in securing a convoy of ships. His final argument in extenuation of the delay is, that Government believed Sebastopol would have fallen long ago. To hope, to expect it even, might be excusable, but was it 'wise or prudent' to take it for granted? and to make little or no provision for the possible, nay the probable, contingency of its holding out? They knew it to be one of the strongest fortresses in Europe; they expected the Russians to defend it with tenacity; and it required neither military science nor statesmanship to discover that the Czar would strain every agency at his command to retain this keystone of his power in the East. Every motive of interest and pride impelled him to send division after division while the road was open and a soldier could be spared—to exhaust almost the empire to save the Crimea, and with it his prestige, his navy, his arsenals, a large part of all which made him great and dreaded throughout the territories washed by the waves of the Euxine.

Euxine. The only secure policy on our part was not merely to rival but to surpass the Czar in such self-evident tactics, and to go on concentrating the means of attack in a greater ratio than he could accumulate the means of defence. The time to stop is not while the struggle is pending, but when the end is gained.

Soldiers are useless without equipments; and when the 20,000 men were embarked in the spring they were so scantily supplied with the materials of war, that the notion was confirmed that they were to await the enemy in the trenches of Gallipoli. But the Ministers had contrived a campaign of a more adventurous kind. 'They had,' says Mr. S. Herbert, 'a distinct plan, which was—first, to secure the Dardanelles; next, to defend Constantinople; next, that capital being safe, to defend the lines of the Balkan; and lastly, to be ready to attempt to strike a blow at some vital part of the Russian empire.' Yet the army which was to accomplish these vast designs was utterly without the means of transport; and when it arrived at Varna was as incapable of moving against the enemy as the ground on which it trod. The siege of Silistria was raging, and it was universally supposed that the place must fall unless it was instantly relieved. No means of locomotion existed in Bulgaria, none had been provided, and our soldiers were in consequence condemned to inaction, while every day they were expecting to hear that the fortress had been taken. 'I had warned the Government,' says Mr. Layard, whose political views we do not share, but who, it must be admitted, has shown upon this question a prescience worthy of his singular knowledge of Eastern countries and affairs, 'that our army would find no means of transport in Bulgaria.' But though they had a 'distinct plan,' in which waggons were as necessary as swords and muskets, this 'wise and prudent' Ministry were deaf to counsel, and made no attempt to supply the want.

In many other respects the army was deficient in the necessary equipments. In military stores as in men there has no doubt prevailed under various administrations, as Mr. Sidney Herbert alleges, an imprudent economy. For nearly a twelvemonth before the war broke out, it was, to say the least, no unlikely contingency. A man so sensible of the dangerous poverty of our arsenals even for a time of peace, and who saw the possible demand that might be made upon them, might have been expected to avail himself of the opportunity to accumulate materials which in any case he maintains to have been needed. From the spring of 1853 to the spring of 1854 we should suppose him incessantly occupied in remedying the defect; and the only valid defence he could have made for himself, and the Cabinet to which he belongs, would have been to show that they did as much as men



men could do in a single year—that they asked of Parliament ample supplies, and that they spared neither pains nor expense in filling up the voids at Woolwich, Portsmouth, and Plymouth.

But whatever else was lacking, the Government could boast that in one thing they had been bountiful to excess. Lord Granville feared to tell his auditors the quantity of ammunition which had been shipped, lest the statement should sound like the tale of Baron Munchausen. That he might not put the credulity of the Staffordshire yeomanry to too severe a test, he was satisfied with saying that it was sufficient to wear out the 60 heavy guns which accompanied it. Wonderful to add, the earliest want felt was the scarcity of ammunition, and we learn from the speech of Mr. Layard, 'that had we continued the fire we opened the first day, and which barely sufficed to keep down that of the enemy, our ammunition would have been exhausted in six days.' The batteries in consequence had not been a fortnight at work when an order was given that each gun should be discharged only twenty times per diem, or once in every half-hour. Even with this excessive economy the firing had not continued three weeks when, as we read in the letters of the correspondent of 'The Times,' we had consumed a large part of a second supply of ammunition, nearly equal to that which had been originally despatched. When it is remembered that at the siege of Valenciennes in 1793, the allies kept up an incessant firing for *six* weeks from *four* times the number of cannon which the English have placed in position before Sebastopol, it is evident that the amount of powder and ball which staggered the imagination of Lord Granville must have been exceeding moderate, and might safely have been specified without endangering his character for veracity. Far different from the conceptions of the Chancellor of the Duchy of Lancaster are Russian notions of what constitutes a well-filled magazine. Though they have considerably more cannon and of heavier metal than the French and English combined—though they have suffered more from explosions than ourselves—though they had been drawing upon their stock for days before we discharged a shot—and though they fire furiously at hours when our guns are silent—they as yet practise no economy and fear no exhaustion. 'I have no hesitation in saying,' wrote a French officer as early as the 4th of November, 'that since the invention of gunpowder there never was so much wasted before.'

The stores which were sent were rendered unavailing through mismanagement. A complaint was made, which excited great indignation, that the sufferings of the wounded soldiers were exasperated from the want of lint. It was understood that the Government pronounced the rumour to be a calumny, the public were

were discouraged in their design of supplying the deficiency by private charity, and were told that their minds might be at rest upon the subject. Miss Nightingale sailed with her devoted band, and on her arrival found that the charge was not only true, but though weeks had elapsed nothing had been done to remedy so cruel a neglect. Now, we are informed by the Government that 36 acres of lint were shipped from England, but the lint was consigned to Varna and the wounded to Scutari. Orders were given that the stores should be removed from the former place to the latter at the time when the army embarked for the Crimea; 'but,' says Mr. S. Herbert, 'that order, in the hurry and bustle of departure, was never executed.' Who then is the delinquent that receives such pressing orders and neglects to execute them? or were the orders given and the means to execute them withheld? Is no one to be responsible for such misdoings, and is it enough for Ministers to dismiss a neglect which caused enormous suffering, and lost numerous lives, by simply pleading 'hurry and bustle?'

In another instance, the little consideration which was shown in securing the commonest care for the men who were the victims of a battle fought for the benefit of their country is really aggravated by the defence which has been offered by the Government. It has been often asserted, and Mr. Layard told the House of Commons that he was a witness of the fact, that many of the wounded after Alma were left for two nights on the field, while our allies immediately collected and relieved their disabled comrades. 'The French army,' retorts Mr. S. Herbert, 'took fewer men than we did, *and carried their ambulances*,' which is equivalent to saying that the French were considerate, and that we were not, that they held ambulances to be an essential part of their equipage, and that we could tamper with the lives of our soldiers to avoid the incumbrance of extra baggage. No stranger specimen of parliamentary logic could anywhere be found than this attempt to explain away the disadvantageous contrast by alleging that the French had been provident and we had been reckless. Nor, as we have touched upon the subject, will it be amiss to add from the speech of Mr. Layard another circumstance connected with these ambulances, which, in the language of the honourable member, 'illustrates the manner in which the Government has managed details during this war. Instead of young and active men having been sent out to attend the wounded, old pensioners, who, after long service, had retired to pass the remainder of their days in the sanctum of the public-house, and most of whom were suffering from *delirium tremens*, were selected. They were expected



pected to take charge of mules—animals of all others the most difficult to manage, and what they had probably never seen before. The result was that the woods about Varna were soon full of wild mules and fragments of harness, the pensioners were found dead by the road-side, and the ambulance corps became perfectly disorganised and useless.' The same want of discretion and system has been manifested throughout. No one will have forgotten the description by the correspondent of 'The Times' of the reckless waste and confusion which disgraced the harbour of Balaklava, and we could fill pages with statements of similar thoughtlessness and incapacity, derived from published accounts and private communications. The Government were called upon to make timely exertions to put a peace establishment upon a war footing, and they neglected to do it. They had men to recruit, they had stores to provide; they began the work late, and when it was commenced their exertions were fitful. The soldiers collected, they had to make a wise distribution of them—to have an army in the field, a reserve at Malta or Gallipoli, and regiments of recruits in training at home. The reserve was small and retained in England, the reinforcements were delayed till we had narrowly escaped a terrible defeat, and when the recruits fell off in the summer the alarmed Government took no effectual measures to attract them to the service. The stores had to be shipped betimes, to be conveyed to their destination, to be placed under the control of responsible authorities to be regularly dispensed and carefully husbanded. A vast number of them on the contrary were tardily sent; and because no thought had been taken for the supervision of them after they left our shores, they miscarried, they were lost, they were spoiled, they were left behind, they were even overlooked, and brought back in the hold of the ship which took them out, or being conveyed to the spot where they were to be used were piled up or hid away like so much lumber. What, then, are the 'general measures' of this Cabinet, which the Chancellor of the Exchequer assures us 'have been dictated by wisdom and prudence?' Neither he nor any other member of the Government has yet ventured to name them; and when it is demonstrated that army and equipments, men and *matériel*, have all been neglected and grossly mismanaged, it is mere hardihood to reply that Ministers do not profess 'to be able to stand a minute scrutiny on every point of detail.'

The gist of the charge against Ministers was admirably summed up by Lord Derby in his powerful and eloquent speech on the first night of the session. 'My complaint,' he said, 'against the Government is this, that they have from the commencement,

mencement, and before the commencement, of the war, lived, as it were, from hand to mouth; that they never anticipated in due time the contingencies of the struggle in which they were about to engage; that they never considered the greatness of the undertaking upon which they were entering; and that they never made adequate and timely provision to meet, not the contingent exigencies of the day, but those exigencies which the fortune of war rendered inevitable.' When a crisis arose, the Ministers were active; they were active in despatching troops in the spring, when at last they discovered that we must fight; they were active in sending out reinforcements after Inkerman, when they saw that the army was on the verge of annihilation; they were active in endeavouring to obtain recruits when they found that the reserve was about to embark, and that our dépôts were drained. But these are the qualities of a clerk, and not of a statesman. It is within the capacity of the lowest official in the War Department, with unlimited funds at his command, to issue orders when the want is specified, and he has united England to tell him what to do. What is expected in men who assume to regulate vast and complicated transactions in an hour of peril is that mental sagacity which can anticipate wants; that wisdom which can contrive the means of supplying them; that administrative ability which can organise agents to carry into effect the intentions of their superiors; and in all of these points the failure has been complete. Never were any set of men at the outbreak of a war in so advantageous a position. Domestic difficulties they had none whatever; the country, with hardly a dissentient voice, practically placed the whole of its resources at their disposal, and urged them to use the confidence, without stint or measure, for the public benefit. But the power of England is nothing better than a name unless it is brought to bear upon the scene of action; and this duty, which is the only one they have had to perform, has proved beyond their strength.

Where the mistakes have been so capital and glaring, the little which Ministers have effected is no set off against the much they have left undone. In a struggle of life and death those who assume the responsibility of conducting affairs must display a prescience and an energy commensurate with the magnitude of the stake. It is a prerogative of superior minds to rise with the occasion, and the men who seize upon the post of honour must show themselves worthy of it or incur a censure as overwhelming as the calamities they cause. Until a second Minister of War arises as great as himself, the first William Pitt will be the standing example of the victories which a master intellect secures by providing the means for them. Never since has the power of Great Britain been in the hands of a civilian who had the strength and skill to wield it. Yet if his genius is not hereditary, it is still possible to imitate the general principle upon which he proceeded of developing the entire force of the country and directing it against the enemy.



But will the Ministers, profiting by experience, act upon past warnings and make ample provision for future emergencies? Constituted as the Government is at present, we have not the slightest hope of any such result, for the very nature of their errors betrays an utter ignorance of the first principles of war, and an obliviousness of the most obvious wants of an army. Their latest proceedings with reference to the supplies which have been forwarded to the Crimea are of a piece with all which has gone before. 'The want of clothing,' writes the correspondent of 'The Times,' 'the want of fuel, the want of shelter, the want of food, which have cost the army and the nation so dearly, might, I sincerely and solemnly believe, have been obviated by a small exertion of ordinary *prévoyance*. The articles which are arriving to-day (December 4) in the Belgravia should have been here long ago, and the supplies we are expecting daily, however welcome, are late. They will be of service only to those who have survived, or have maintained health and strength under cold and wet. We have tents, but cannot get them up to the camp. There is a great deficiency of hospital marquees; and, horrible as it is to think of such a thing, it is no less true, that according to information received from no doubtful source, five men of a battalion of the Guards were found dead outside one of the tents within the last thirty hours.' Precisely a week after these Guards had perished from want of shelter, Mr. S. Herbert was triumphantly declaiming in the House of Commons upon the alertness he and his colleagues had shown in providing that shelter for the lack of which so many brave soldiers had already died. 'Then with regard,' he said, 'to providing huts for the troops, what have the Government done? *They felt that, in this particular, time was everything.* To have them built here at home, and then send them out to the Crimea, was felt to be a process that would occupy much too long a space of time; *but the moment the requisition for huts arose*, we telegraphed to Lord Westmoreland at Vienna, and to Lord Stratford at Constantinople, desiring them to send out instantly such huts as they could have constructed in those countries.' 'They felt that time was everything,' and not a hut had arrived up to the middle of December! The next sentence explains the anomaly; according to their custom, they did nothing till 'the requisition for huts arose.' Well might Lord Grey observe that the necessity of providing for the wintering of the troops ought to have been foreseen, and the measures taken months before;

before; that even if Sebastopol had fallen there was a probability that it would be reduced to a heap of ruins and afford no shelter to our troops; or supposing them to have been withdrawn altogether from the Crimea, they must still have required accommodation elsewhere. A Government which cannot attain to the conception that winter quarters will be needed for the troops until they hear that winter has overtaken them, has so much to learn, that we trust they will not be permitted to have our noble army for the *vile corpus* upon which to practise, even though it were certain that death and disaster would finally teach them common foresight and prudence.

Heavy accusations of neglect and incapacity have been made against the commander of the expedition. This excellent nobleman, who is placed in a situation of extreme embarrassment, and whose moral fortitude has been most severely tried, has not, like the ministers, had the opportunity—we cannot in their case say the advantage—of speaking in his own defence; and everybody knows how often apparently unanswerable charges are triumphantly refuted when the other side of the question comes to be heard. But it is palpable upon the face of the statements we possess, that most of the evils complained of are to be ascribed to the Government, and were neither caused, nor could possibly be cured, by the officer in command. A writer who asserts that Lord Raglan is getting into disrepute with the troops for want of proper attention to their comforts, and who cannot therefore be considered a favourable witness, specifies the miseries from which they are suffering as follows:—'Fever and rheumatism become general—just what one might expect from the fact of men being hard-worked, ill-fed, ill-clothed, and never dry. Hardly an officer, and not a man, has a dry bed to lie down upon. Many of the men have not been really dry for now close upon three weeks: added to this is another misfortune, in the shape of scarcity of fuel, which compels a great majority of the army to eat their rations of salt pork uncooked.' 'We have only one blanket,' says another, 'to wrap round us when we lie down; and our tents, owing to so much rain having fallen, are very damp. Many of our poor fellows have scarcely a bit of shoe to their feet, many others not a shirt to their backs, and the consequence is, that our men are dying quite fast.' A third describes the Guards as tying haybands round their legs to keep their trowsers together; and a fourth, after stating that the stoutest men are giving way, asks, 'How can it be otherwise, living, or trying to live, almost naked in mud, and worked to death in spongy rags, hanging in tatters about them, and covered with Russian vermin?' That the soldiers were without clothes, shirts, or shoes, that their tents were leaky, and that they had only



only a blanket to cover them, was not, as has been asserted in some of the letters from the Crimea, the fault of Lord Raglan, but of the Ministers, who forgot to forward proper supplies till so late in the season; and it is hard, indeed, for the commander to have to bear the blame of a negligence which has added immensely to his difficulties, and made his position more anxious and critical. Far different was the condition of the army of our allies. 'We are neither in want,' writes an officer in the camp, 'of provisions, tents, fuel, nor clothing; and but for the rain, and the atrocious mud which it causes, we should be comfortable enough.' General Canrobert does not assume the credit of these results. He ascribes them 'to the wise foresight of the Emperor and his Government,' as the absence of every necessary in the English camp is due to the blindness and procrastination of our own.

A charge which seemed to touch Lord Raglan more nearly is to be traced back to the same source as all the rest of the grievances. The men were put upon half or quarter rations because—although there were plenty of provisions at Balaklava—the mud tracks, which are there in the place of roads, did not permit them to be brought to the camp. The French in the fine weather had made an excellent road to their own quarters. Why, it is asked, did not Lord Raglan do the same? Evidently because the ministers whose duty it was to furnish him with reinforcements had not sent him sufficient to guard his trenches; and, far from having soldiers to spare for road-making, he had not enough by many thousands to watch the enemy and man his lines. 'All the trifling detachments sent out here,' writes an officer, 'are but as a drop in the ocean. ....The duty is so hard and harassing that the same men who come up from the trenches at daydawn in the morning, shivering and wet, have to return frequently to the same post in the evening.' Every account reiterates the story. The sheer fatigue, apart from every other privation, is almost beyond the powers of human endurance, and it is a certain proof that Lord Raglan had no force at his command for supplementary purposes, that when the road became a matter of life or death it had to be constructed by the French.

The condition of our horses, like that of our men, is wretched in comparison with the beasts of burden in the camp of our allies. Over-worked and under-fed, exhausted by hunger and toil, they drop down by scores and die in the mud. How much of this proceeds from the scanty forage transmitted from home does not appear; but an English officer attached to the Turkish army shows that there is another reason for the contrast. 'The English horse, accustomed to warm stables, good food, and groom-

ing, cannot stand the rigour of this climate, exposed as he is in the open air to rain, cold, and snow, often up to his knees in mud, and not half fed. The French cavalry stand it better than ours, a great many having African horses, which never stood in a stable, and can bear the cold better.' That something even here is due to the better management of the French may reasonably be presumed. They far excel us in cleverness of contrivance and completeness of organisation; and it is one of the many advantages of the alliance that we shall learn very valuable lessons from the contact. But a general is not to be condemned if in the midst of a harassing siege he has failed to infuse the national peculiarities of the French into the English soldier, especially as the larger part of the superior arrangements of our allies depends upon stores and training, which no commander can supply at will.

It is one of the characteristic differences of the nations that a French commander shows himself more among the men than is usual with English generals. The Duke of Wellington was never in the habit of mingling with the troops for the purpose of conversing with them. He seldom appeared in the ranks unless to reconnoitre or command; and if Lord Raglan, during the suspension of active operations, has seldom ridden along the lines, he is only conforming to the example of his great master in the art of war. How far the contrary practice is desirable we cannot undertake to pronounce; but of this we are confident, that as the omission is not a personal peculiarity of Lord Raglan, so neither does it proceed from heartlessness or sloth.

When Lord Raglan was appointed to the command of the expedition not a single whisper was heard against the choice. No Marlborough or Wellington was set aside in his favour, nor has any risen up to take his place if he was removed. He was selected on public grounds, because he was believed to be the fittest man for the post. He was the friend and companion of the Duke in his glorious campaigns of the Peninsula and Waterloo; he not only witnessed his proceedings, but he had the inestimable advantage, both then and ever after, of listening to his views and instructions; he was possessed of all the old traditions, and, from his official position, his knowledge had never been permitted to slumber. There was no other person who possessed equal advantages, or gave equal promise. His courage and calmness have even surpassed what was anticipated from his former chivalrous career, and though errors may have been committed, as inevitably they must, nothing has yet occurred to convince us that he has deserved to forfeit the confidence of his countrymen. It is the Government that are to be blamed for the sad condition of our army; and whatever sympathy Lord Raglan may



may have felt for the misery they have endured, it has been out of his power to alleviate it.

The enormous extra cost at which purchases and contracts on a gigantic scale are made on a sudden is a minor, but nevertheless no insignificant evil, and is not to be forgotten in the estimate of Ministerial mismanagement:—

'I saw,' says Mr. Layard, 'a letter a few days ago from a merchant at Liverpool, who, being himself a gainer by the prodigality of the Government, would not have written as he did were not the facts of the case as gross as he stated them to be. After describing the manner in which, at the last moment, transports had been taken up by the agents of Government in the most reckless manner, and contracts for horse-boxes entered into without any stipulations whatever, he ends by saying that this lavish expenditure of the public money had almost turned his hair grey. I need scarcely remind the House of the fate of those horse-boxes. The first time the vessels in which they were fitted up were exposed to a slight sea, they all gave way, and above two hundred of our cavalry horses were thrown overboard, at a time when cavalry was of the utmost importance to our operations in the Crimea. Scarcely a day passes that I do not receive from some quarter or another letters from persons who bring to my notice, because I have taken a part in this question in the House, similar instances of wanton extravagance and culpable neglect. Up to the present moment the Government have endeavoured to carry on this war upon principles of economy utterly inconsistent with its objects and the magnitude of the undertaking. Now they find that the nation is indignant at the shameful instances of mismanagement and negligence which have occurred, they are rushing into the wildest extravagance. Any proposal, however ridiculous, any invention, however absurd, is taken up.'

To do too much at one time and too little at another—to squander twice the sum in haste that would have sufficed if it had been expended with prudence—to procure what is useless and overlook what is needful—to be served with articles, like the horse-boxes, of which the quality is in the inverse ratio to the cost, and which entailed the ultimate destruction of both horse-boxes and horses—to lose half the benefit of the purchases by postponing them till much of the evil has accrued which they were designed to prevent—such are the inevitable consequences of a system in which nothing is foreseen, and the negligence of months has to be repaired in a week. A statement made by Mr. S. Herbert in his speech, as an evidence of the consideration he had shown for the soldiers, is a singular proof of the extravagance which is put in the place of knowledge and exertion:—

'The Government have been charged with being ignorant of the severity of the climate of the Crimea, and with not adopting those measures which are best calculated to protect the troops from its injurious influence. Now what is the position in which we have been placed? I have

I have a letter from a gentleman, a member of this House, but whom I do not now see in his place, but a gentlemen whose opinion is always worth having, who says, "*Experto credo*, I know the climate of the Crimea well; don't believe the accounts that are published about the temperature; but whatever you do, follow the custom of the country; they must know best, and they clothe themselves in skins and not in woollen." I then requested the opinion of a person of great experience in Arctic researches, and he came to me and said, "Don't dress the men in skins, stick to wool, that is the only thing to keep them warm." (Laughter.) I ask the House how was I to decide between these two authorities? Without attempting to do so, I thought the safest thing was to take the advice of both, and to send out both skins and woollen (cheers); and my hope is, that before long every man in the army will have a change both of woollen and of skins from top to toe.'

The House, it will be seen, cheered what sounded at the moment a generous sentiment. But is it fitting for a Secretary-at-War, intrusted with the expenditure of public money levied upon thousands who pinch themselves to pay it, thus to send out clothing for an entire army, one-half of which, according to his own representation, might not improbably prove unsuitable, merely because a couple of gentlemen differ as to which material is best? This is an easy method of conducting a war—it saves inquiry and does away with the necessity for a decision; but though those who adopt it may sometimes be right by chance, the general effect must be a frightful waste of the money of the nation, and a constant inappropriateness in the nature of the supply.

It is doubtful whether the Government are not at this moment sacrificing economy, security, and convenience, by their neglect to establish magazines upon the shores of the Euxine. 'Sinope,' we quote again from Mr. Layard, than whom, on this matter, there can be no higher authority, 'had been pointed out as a port in the Black Sea nearer than any other to the Crimea, communicating with the fertile provinces and large cities of Asia Minor, from which not only cheaper and abundant provisions but supplies of all kinds might be obtained. But these warnings and recommendations were made in vain.' There wood might have been procured in endless abundance, the cost of the huts would have been comparatively trifling, and many a soldier would still be living who has perished in the mire on the heights before Sebastopol. 'Beyond Sinope,' writes Mr. Curzon in his work on Armenia, 'where the flat alluvial land stretches down to the sea-shore, there are forests of such timber as we have no idea of in these northern regions. Here there are miles of trees so high, and large, and straight, that they look like minarets in flower.'

If we turn from the incompetency which Ministers have hitherto displayed, to glance at the existing requirements, there is



is nothing to re-assure us. We are coping with a foe whose resources are immense, and who is lavish of them to wastefulness. While materials remain, his reparations will be equal to the magnitude of the ruins we may cause. His hollow negotiations and pretended concessions are only stratagems of war; and if we refuse to come to terms until we can make a secure peace, the question is nothing less than whether the Czar will be exhausted sooner than England and France. At every pause in our proceedings he is accumulating odds against us, and we run a risk of succumbing because we have opposed the little finger of England to the right arm of Russia. The amount of our armaments should have no other limit than our means and the demands of the crisis. Soldiers, arms, ammunition, reserves—all must be furnished on the largest scale that, upon a liberal calculation, can probably be required. That there may not sometimes be deficiency there must often be excess. Economy, as we have already intimated, is one of the main duties of a long and costly contest, and never should the expenditure of a government be scrutinised with more jealous eyes. But it must be economy in the right place—economy in its modes of management, in its bargains, in its direction of expenditure to useful ends—not economy of men and of stores, which means loss of life, disasters, perhaps defeat and disgrace. If soldiers and all the *matériel* of war could be had at an instant's notice, by sending down an order into the manufacturing districts, Ministers would doubtless be equal to the crisis. Everything, on the contrary, depends on steady foresight and sustained exertion; and the greater portion of what the occasion demands still remains to be done. Sebastopol has not yet fallen; and notwithstanding the risks which were incurred by neglecting to accumulate the means of transport before the commencement of the campaign, yet will it be believed that down to the present moment and ten months since the war began, the army is not even now in a condition to move ten miles from their present position? Before Russia can be forced into a peace we must be enabled to follow her troops, to push forward inland, and make her feel that she must yield, or lose the fairest part of her dominions. Next year the shores of the Baltic also must be the scene of a contest as arduous as that which is going on on the shores of the Euxine, if only to prevent the concentration of the forces of the Czar against the allies in the South. Nor have we only to attack—we must defend. It is maintained by Mr. Layard that the Turkish army in Armenia will melt away unless strongly reinforced; and that there is nothing to prevent the enemy next spring from overrunning the whole of Western Asia. Thus while we are struggling to make good our footing on the Russian soil, the Czar may

may richly indemnify himself by seizing upon this wide expanse of fertile territory. It is not for us to attempt to sketch out a plan for the campaign. It is one of the reasons which make a wise and provident Ministry more than ordinarily necessary that they alone are in a position to estimate thoroughly the situation of affairs. They have means of information at their command, which we fear have been neglected, but which should have enabled them to take a more extended view than any private individual, however able and experienced. Their decisions and schemes must often be secret; and whether they are doing much or little, are proceeding wisely or foolishly, can only in general be known by the event. No substitute can, therefore, be found for their incapacity in the wisdom and vigilance of Parliament; and looking at the vastness and difficulty of the undertaking, and the utter inaptitude which the Government has hitherto displayed, it is impossible to have any belief in their ability to conduct the war.

We have spoken throughout of the Government as a whole, and as a whole they are responsible. But practically the largest part of the arrangements must depend upon the Minister of War. To think for him, and to control him on all essential points, is in fact to depose him; and though an energetic Premier might be expected in such a crisis to exercise a constant and active supervision, the other members of the Ministry can do little more than assist in framing the general policy for the year. The Duke of Newcastle, who holds the office which at the present moment is the most important in the administration, has not the faculties for the task, and to this sole circumstance must be attributed many of the mistakes which have been committed. The talents which are required to carry on a war are of so exceptional a kind that it is no disparagement to a peer, the whole of whose experience has been derived from the functions of peace, that he should not be equal to the emergency. He becomes blameable only when in an hour of peril he clings to a post for which he is universally pronounced to be unfitted. His appointment when he was nominated gave general dissatisfaction. All parties were agreed that Lord Palmerston was the member of the Government whose previous career afforded the best hope that he would prove an active and intelligent Minister of War. Lord Aberdeen was not bound by this strongly-expressed opinion of the public; but when he acted in defiance of it, nothing could justify him except the signal success of the man of his choice. Personal courtesies are crimes when they are paid for by the lives of hundreds of our soldiers; and not an hour ought to be lost in cancelling an arrangement which has turned out so unfortunate. Lord Ellenborough spoke of the great mischief which was



was occasioned by having so many persons in the Cabinet of nearly equal ability, without one statesman of pre-eminent capacity to keep them in order. Unless there is either subordination or unanimity of opinion the public business must be impeded; but it is at least an equal evil that the most important offices are not held by those who are most competent to fill them. The indignation which broke out after Inkerman has subsided into murmurs, but distrust and dissatisfaction are widely spread; and though the public, in spite of unavoidable errors, will support a Government which does its duty, it will take little more to raise a tempest of anger against men who jeopardise everything out of delicacy to one colleague or jealousy of another.

A re-distribution of two or three offices might be attended with beneficial effects; but it demands no exorbitant patriotism to go further still, and form a War-Government irrespective of party. The distinctions of Whig and Conservative are suspended for the time. No great measure of civil polity could now be entertained until the national struggle in which we are engaged takes a decisive turn. The experiment was tried by Lord John Russell, and neither the Parliament nor the country would listen to his proposal. While all domestic questions which can raise party differences are thus in abeyance, men with a spark of love for their country can surely act together for the common good. In truth, a War Ministry would have the advantage of a unanimity upon the business of the hour, which we venture to assert has never been enjoyed by the present Cabinet. Nobody supposes that the sentiments of Lord Palmerston and Lord John Russell, for instance, can have been in unison with those of Lord Aberdeen, although they may have managed to keep up a semblance of agreement, and no little mischief has already arisen from the attempt to combine these jarring elements of hot and cold. In the actual state of things the country loses the services of the statesman who has the greatest knowledge of military affairs, and who is not surpassed in energy, courage, and independence by any man alive. It is no rash prediction to hazard that, with Lord Ellenborough for Minister of War, the whole of our proceedings would wear a new aspect before six months had expired. Not the least advantage of the appointment would be the pledge it would afford the country that the first draught of troops under the provisions of the 'Foreign Enlistment Bill' would be the last. No end could be answered by discussing here a question upon which argument has been exhausted. It is enough that the step was opposed to the feelings, in part it may be allowed to the prejudices, of the class from which recruits are obtained, that it checked their enthusiasm, and threatened to deprive us of English in the same degree that it furnished us

with German troops. Labour at home is abundant. It is not for subsistence but from a military disposition that our men are attracted to the ranks; and whatever has a tendency to quench the spirit, which is the strength of the nation, is fraught with peril.

It is not the immediate physical effects which are alone involved in such mismanagement of the war as we have hitherto witnessed. The feelings of the people will be abated in some quarters, and die away or become hostile in others. There are certain states of mind which have been epidemic with our public whenever a contest has been waged in modern times. The notion that our soldiers and sailors had degenerated is, for example, a perennial illusion. It arose at the commencement of the conflict consequent upon the French Revolution, and Burke then reminded the world that Dr. Browne, at the beginning of the Seven Years' War, had endeavoured, with the applause and assent of his countrymen, to demonstrate, in a philosophical discourse, that the distinguishing features of the people of England had been totally changed, and that frivolity and feebleness had become the national characteristic. Never, Burke remarks, did our masculine spirit display itself with greater energy than at the time when the kingdom was subscribing to speculative arguments to prove us ignobly effeminate. We have again witnessed the same misgivings in a minor degree till Alma and Inkerman dispelled the calumny. In contradiction to this notion, and yet in company with it, there has always prevailed at the opening of our wars a contempt for our antagonists—a belief that British bravery could contend against any odds, and that the enemy would be driven before us like chaff before the wind. This, too, we have witnessed. The unexpected success of the Turks on the Danube, the victory of the Alma, the false report of the taking of Sebastopol, all confirmed the disposition to underrate the comparative prowess of our foe. Invariably this over-confidence at the outset has been followed by undue apprehension at the first obstacle or reverse, and a few weeks ago there existed in the country a wide-spread alarm which almost amounted to pusillanimity. With such a repetition of former precedents, it is not very likely that one other will fail which has never been wanting—weariness of a contest which promises to be protracted, and a desire to end it upon any terms which are not absolutely disgraceful. It was well observed by Lord Ellenborough that the present was pre-eminently 'a stateman's war—a war far-seeing in its object, and that, though popular at first, unless there was a constant succession of successes to captivate the people, it would be extremely difficult to maintain throughout the steady support of the public.' If the war is sluggish and inglorious, as well as costly in money and blood, it will not be long before



before many will ask, with Mr. Cobden, whether the end is worth the sacrifice. The ranks of his followers—now few in number—will be swelled by fresh recruits, who will assert with him that we have already accomplished the object for which we took up arms, and a party will be formed which will clamour for a premature and ephemeral peace. Nor will the Government be indisposed to listen to the demand; for, harassed and perplexed by the embarrassments they have brought upon themselves, they will be glad of an excuse to escape from their difficulties. Even now the language used by Lord John Russell, in reply to Mr. Cobden, excites a misgiving as to the policy and firmness of the Government.

The energies of Russia have for generations been mainly directed to the development of her military strength, to securing old conquests and preparing for new. By violence, by threats, by falsehood, by bribes, by intrigues, she has incessantly extended the boundaries of her empire. The normal state of the Muscovite is war, and the secret of his success is, that he has always been able and willing to fight, while those who alone had the strength to resist him were anxious for repose. They remonstrated, but they submitted; right and reason were on one side, the victory on the other. Yet, as Russia had never laid aside for a single day her schemes of spoliation—as her occasional moderation at particular periods was only assumed to mask her ultimate designs—it was evident that the danger would become, at last, too great to be tolerated, and a stop must be put to concession. The Secret Despatches showed that the Czar imagined that the hour had arrived when he could grasp Constantinople; and the revelations contained in these papers, with other occurrences all tending to the same end, convinced the immense majority of Englishmen that we ought no longer to delay to beat back the aggressor before he could clutch his prey. But it was not merely the last injustice that we were called upon to redress. What we want is security for the future—to put a curb upon the insatiable rapacity of this invading nation, which will otherwise return to her old attitude and renew her former career. It is only at the end of a series of wrongful aggressions that we have taken up arms, and it would now be folly to lay them down again until we have come to a satisfactory settlement of the whole account. When, therefore, Lord John Russell declares that the Government do not desire to deprive Russia of any of her territories, we think that views so contracted indicate more eagerness to escape from the difficulties of war than ambition to extort a durable peace. There is no desire among the people of this country to reduce her from a first to a second-rate power; but if she is to be left with all her present possessions, what

what protection do we obtain against future encroachments? 'Russia,' said Lord Lyndhurst, in the wise and masterly speech he delivered last June in the House of Lords, 'carrying diplomacy to the extremest point of refinement, has introduced a new and significant term into that mysterious science, namely, the term *material guarantee*. If the Emperor will give a guarantee of this description, something solid and substantial, as a pledge of his fidelity—something that he would be unwilling to forfeit—such a guarantee might enable us to hope for a lasting peace; but to rely upon a mere paper guarantee—a mere pledge of his Imperial word—would, your Lordships must feel, be the extreme of folly and weakness.' Even though Sebastopol, as will probably happen, should be levelled to the ground, and every vessel within its harbour be destroyed, is it possible to doubt, if we are not to alienate one inch of ground, that the prediction of Mr. Cobden will be verified, that in ten years it will be rebuilt more strongly than before with money borrowed from the people of England? Or if it is to be a condition that Russia is to have no fortress in the Black Sea, the article would be violated on the first dissension between the other powers of Europe. 'You do not destroy or touch Russian power,' Mr. Cobden justly said, though for a different purpose from that for which we quote him, 'unless you can *permanently* occupy some portion of its territory, disorder its industry, or disturb its government. If you can strike at its capital, if you can take away some of its immense fertile plains, or take possession of those vast rivers which empty themselves into the Black Sea, then indeed you strike at Russian power.' This is so obvious that we cannot believe that the expressions of Lord John Russell are to be literally understood; but if indeed both he and his colleagues have dwarfed their schemes to bring them down to the dimensions of their management—if they are as hasty to conclude an abortive peace as they were slow to begin an inadequate war—then the interests of England are no longer safe in their keeping, and, whatever may be the difficulties attending at present an entire change of ministry, they can and ought to yield to the paramount necessity of a foreign policy in harmony with the expectations and present spirit of the nation.

The most moderate conditions that will afford a fair prospect of protection from the future encroachments of Russia are all that we ought at this moment to demand, but if we are compelled by the continued obstinacy of the Czar to protract the war, a new state of things will probably commence which must end in depriving him of provinces which by timely concession he has it in his power to retain. No pains should be spared to unite Europe in a general league against the common enemy, and none



none of the parties to the contract can then be expected to withdraw from the contest until one and all have obtained satisfaction for the wrongs they have suffered or have reason to apprehend.

One happy circumstance at least has grown out of the collision—

> 'the mutual league,
> United thoughts and councils, equal hope
> And hazard in the glorious enterprise,'

which binds together France and ourselves. The feeling upon which the alliance is founded has been gradually increasing for some years past, and would have been earlier apparent except for the suspicion of each that the old enmity was still entertained by the other. Any prejudices which may have lingered here have already passed away, and the entire nation desire nothing more ardently than the perpetuity of a union which will confer more lustre upon the reign of Louis Napoleon than if he had been the hero of a hundred fights. No two countries can do each other equal harm or equal good, and while the rivalry which struggled for supremacy was a source of weakness to both, the greatness of both will be vastly increased by mutual aid.

No doubt can now be entertained that Austria is to be classed in the number of our allies. If she has been slow to act, it has arisen from the enormous difficulties of her position. In peril of rebellion, and with her finances disordered, her frontiers were exposed in addition to the attack of the Czar, who, if she had braved him before her army was fully trained and equipped, would have seized upon Vienna. We who are safe from the inroads of the enemy, may commit the imprudence of making war upon a peace establishment with a certain amount of impunity; but had Austria been as rash in her movements as England, she would have had to endure incalculable evils herself, and could have rendered no assistance to the common cause. It is as much for our interests as her own that she has waited until she was able to strike with effect before she provoked the blow that might have crushed her, and deprived us of her aid. That Prussia must follow in the wake of Austria can hardly be questioned. Isolation, if it were possible, would reduce her to insignificance, and she must either enter into the league against Russia or lose her place among the powers of Europe.

The dangerous vicinity of Sweden to Russia is at once the motive and the obstacle to her joining the alliance. The Muscovite has always preyed upon his weaker neighbours, and there would be no surer method of imparting strength and adhesion to all the states which surround him than for the greater powers to give the lesser a guarantee. If Russia cannot do an

injustice to one without obliging all to resent it, the feeblest member of the alliance has the strength of the whole; and, unless some European convulsion broke forth, an effectual barrier would be raised against future encroachments. This is the method to obtain a speedy peace, and to preserve it when it is obtained. Russia, encompassed upon every side, must yield to the pressure, and will thenceforth be unable to break the bounds prescribed to her by Europe. But success in negotiations as in war must depend upon those who conduct them; and, since men of all parties have supported the Government because this is a national and not a party question, it is not for ministers alone to show themselves wanting in patriotism by permitting their own political and personal predilections to stand in the way of the public weal.

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Just as these sheets were being printed off, we received the intelligence that Russia had accepted the Four Points. If our article had been written with a knowledge of this circumstance, we should have endeavoured to enforce the same views we have already expressed, and should not the less have urged the propriety of some change in the Cabinet. We believe, indeed, that there will be greater need than ever for vigilance and firmness. We dread the diplomacy of Russia more than her arms. We are apprehensive that her submission is a device for detaching Austria from the alliance, and for paralysing our preparations for the next campaign. Hostilities, it is affirmed, are not to be interrupted; but we are alarmed lest the Government should repeat their former errors, and, lulled into false security by the negotiations, should relax in their efforts to provide armaments against the spring. Any such suspension in our efforts would be the height of folly and false economy. The mere pecuniary cost of preparing for war is vastly less than that of war itself, and should Russia really yield to our demands, it will only be because we hold ourselves in readiness to exact what she refuses. In ignorance of the guarantees that will be asked of her, and the amount of the indemnity which will be required for the expenditure we have incurred, we can give no opinion upon the conditions of peace proposed by our Ministers. We trusted them to provide for the contingencies of war, and found ourselves deceived. If, taking advantage of the secrecy with which the negotiations must be conducted, they should again disappoint the reasonable expectations of the public and assent to inadequate terms, they will not, we venture to predict, be able to withstand the storm of reprobation which is justly due to men who, through weakness and incapacity, have betrayed their country.

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# PLAIN ADVICE TO ALL

DURING THE

# VISITATION OF CHOLERA.

TO WHICH ARE ADDED,

## Directions, Precautions, and Recommendations,

ADDRESSED TO INDIVIDUALS,

OR

THE HEADS OF FAMILIES OR ESTABLISHMENTS:

*From Official Documents.*

LONDON:
CHARLES KNIGHT, 90, FLEET STREET,
PUBLISHER BY AUTHORITY TO THE GENERAL BOARD OF HEALTH AND THE POOR LAW BOARD.

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LONDON:
REED AND PARDON, PRINTERS,
PATERNOSTER ROW.

## NOTICE.

THE "PLAIN ADVICE" here reprinted, has been published in the form of a Bill or Placard, of which many thousands have been distributed by Local Authorities.

The object of this publication, in the shape of a Tract, is to support the "ADVICE," by various Directions and Precautions, *addressed to Individuals, or Heads of Families or Establishments.*

A body of information, addressed to Officers intrusted with the execution of the "Directions and Regulations of the General Board of Health," is also published by Mr. Knight, entitled, "HOW TO MEET CHOLERA, a Guide for Parish Officers, Sanitary Committees, Clergymen, and Others, intrusted with the Duty of adopting Means to avert the Visitation of Asiatic Cholera, or to alleviate its Severity when present: by JAMES J. SCOTT, Esq."



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## PLAIN ADVICE TO ALL.

1. Conform to and assist every measure of prevention, or remedy, put in operation by the Local Authorities; for such measures are founded upon knowledge and experience, and are enforced by the direction of Government for the public good.

2. If you sustain inconvenience or apprehend danger, from any Nuisance, Public or Private, immediately complain either to your Local Board of Health, your Town Council, or your Board of Guardians, as the case may be: any of whom are fully empowered to enforce a remedy.

3. Apply yourself, as far as lies in your power, to render the chief duties of Parochial and other Public Officers unnecessary, inasmuch as regards your own Home, by the instant removal of every Nuisance about it and in it.

4. It is the special duty of the Authorities at all times, but imperatively so now, to have all Streets, Alleys, and Courts daily cleansed. But it is your duty to throw no refuse into the streets, nor to collect any in your back premises. Have no dung-heaps, no ash-heaps. Keep no pigs in close places. Make the scavenger and the dustman take away

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whatever is annoying. Have no sloppy holes in your areas or back yards, but get them paved or levelled. Insist upon your landlord making your house water-tight. See that your windows will open and shut, so as admit air and exclude moisture. Every epidemic, whether Fever or Cholera, rages amidst dirt and damp, and where there are stinking kennels and open ditches, foul with dead animals and decayed vegetables. Avoid all such places to dwell in; and make your children when they go out avoid all bad-smelling places.

5. Look to the inside of your dwelling, as well as outside, to get rid of Nuisances. Are the walls and ceilings dirty or mouldy? at the cost of a shilling or two they may be lime-whited. This has been found one of the most effectual preventives of Cholera. Avoid, if possible, crowding your sleeping-rooms. If there is a Chimney in a Bed-room, keep it open, and have no chimney-board, or chest of drawers, to stop it up. It would be good to make a hole, three or four inches square, near the ceiling, into the chimney—a very easy ventilator. Get pure air into your rooms by every possible means, and get rid of the foul air in the most effectual manner. If there is a constant offensive smell within your dwelling, which other people as well as yourself notice, be sure that there is danger at hand; and never rest till you have ascertained the cause, and have got it removed, as far as possible. Complain to the landlord: if he neglects you, complain to those who have to enforce "The Nuisances Removal Act." If you cannot get the Nuisance removed, you ought to prepare to remove from the Nuisance. If you go to other Lodgings or Houses, go to those where there has been no



fever. There are houses, with no fault of construction, that are always disagreeable to the senses. They are the abodes of sluttishness—the forerunner of disease. The person is seldom clean, when a dwelling is dirty. Personal cleanliness and house cleanliness are both health-givers, and are of vital importance when the elements of disease and death are around us.

6. This Advice, with regard to your Dwelling, assumes that you live in a populous town; but the principles on which the Advice is founded hold good, whether you dwell in a Village, or even in a lone Cottage. All places, it is to be feared, have their Nuisances. If there is a dung-heap at your threshold, remove it to a distance. If a foul ditch, or cesspool, stir yourself to have a change. If the pigsty is offensive, cleanse and wash it daily. Have no poultry, or rabbits, within doors. In a word, get dirt and damp away from your house, and out of your house, and get pure air into it. Be clean yourself, and have everything clean about you.

7. Having looked to your Dwelling within and without, consider what is best for your welfare as to Food and Clothing. Whenever Cholera is present in a locality, there is a general tendency to irritation of bowels, and Warm Clothing and Wholesome Food are more than ever necessary. These happily are within the reach of the great body of the People. The extreme Poor must be righteously cared for in these respects out of the abundance of the more fortunate; but all have in their power to avoid what is hurtful. Avoid cold; but make yourself strong by exercise in the open air, if your employment is within doors. The same duty of exercise applies to all your family,



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male and female. If there is any food or drink injurious at ordinary times, it is doubly injurious when there is pestilence in the atmosphere. Be very careful not to drink impure water; and take heed that wells are not polluted, and that water-butts and cisterns are kept cleansed. Spend less money on beer and other drinks, and spend more on flannel and coals.

8. The following personal *Precautions* against Cholera proceed from the General Board of Health:—

"Cholera is not so suddenly fatal as is supposed; it comes on with looseness or bowel complaint, which goes on for some hours, or even for a day or two. *There is often no pain;* but no one must be put off his guard by this circumstance, but must *immediately, when purging comes on, apply for proper medicine, by which the disease is usually stopped. Where Cholera is prevalent in a district, the neglect of this caution for a few hours may be fatal.*

"Cholera is often brought on by improper diet. Tainted meat and fish, and damaged vegetables, should be carefully avoided.

"Cholera is often brought on by excess even of wholesome food. The greatest moderation should be practised both in meats and drinks, always avoiding long fasting. Ardent spirits should be taken only under medical advice. Drunkards always suffer most.

"Cholera is often brought on by cold. Wet clothes should be immediately changed; the feet especially should be kept warm and dry. The most violent attacks often come on immediately after incautious exposure to damp foggy night air."

9. If an attack, even the slightest, should come on



in your household, you must immediately apply for medical assistance. Arrangements will be made in every locality to render such assistance promptly and effectually. There is no disease which can be more readily met than Cholera in its first, or premonitory stage. In cases of diarrhœa, or looseness of bowels, the following medicine is recommended by the Board of Health; but avoid, if you can, exercising your own judgment in giving medicine at all:—

Twenty grains of opiate confection, mixed with two tablespoonsful of peppermint water, or with a little weak brandy and water, and repeated every three or four hours, or oftener if the attack is severe. Half the quantity to persons under fifteen—smaller doses to children.

10. If the disease assume a violent form before help can be obtained, put the sufferer into a warm bed, apply bottles of hot water or heated flannel to the stomach and feet, and along the spine. A dessert spoonful of brandy may be given from time to time in hot water. Constant friction with flannel dipped in hot vinegar is recommended, as well as the application of a vinegar and mustard poultice over the belly. A prudent person will have the necessary articles at hand. But promptitude in getting assistance is the first duty. By night or by day send for the doctor; and such is the zeal of the medical profession, that the humblest person will not send in vain.

11. If any of the evil habits and neglects, referred to in this Advice, exist in yourself or your family, begin to alter such habits, and avoid such neglects, without an hour's delay. The desired change to enable you to meet this Epidemic Disease is good for every other; and an immediate preparation may save

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a vast amount of misery. The condition of the human body cannot be altered at once; but the practices which tend to an evil condition may be instantly changed. In days you may effect a change which you cannot effect in hours.

12. Whether the disease of Cholera come into your household or you be spared, keep up your spirits; have no vain fears; relax no industry; shrink not from assisting your neighbours; and put your trust in Him in whose hands are the issues of life and death.

## HOW TO REMOVE A NUISANCE.

Local Boards of Health, and Boards of Guardians, under the Public Health Act, and the Directions and Regulations of the General Board of Health, issued under an Order in Council, have power to provide for

The Cleansing of Streets.

The Removal of Filth, Dung, &c.

The keeping in order of Waterclosets, Sewers, and Drains.

The Filling up or Covering of Places used for the collection of Liquid Filth.

The Whitewashing and Cleansing of Filthy or Unwholesome Houses.

And the Regulation of Common Lodging-houses (under "The Common Lodging-houses Act").

Persons in the District who have to complain of Nuisances, should act as follows:—



If there is a Board of Health in the Town or District, make complaint to the Inspector of Nuisances to the Local Board.

Or,

Bring the Nuisance before the Guardians, who have power to examine and inquire into it, and order its removal or abatement.

There is a penalty not exceeding Five Pounds for disobedience.

And if the Owner or Occupier of the Premises where the Nuisance exists is unable, from poverty or otherwise, to do what is necessary, the Guardians may remove the Nuisance at the public cost.

## WHAT BOARDS OF GUARDIANS HAVE TO DO IN TIMES OF EPIDEMIC DISEASE.

The Board of Guardians have powers, under the Directions and Regulations of the General Board of Health,

To Inspect by their Officers Unhealthy Localities.

To Certify Unwholesome Houses or Nuisances.

To Direct what is to be done where they find Epidemic Disease, or the Premonitory symptoms of it.

To Provide, where necessary, for House-to-House Visitation.

To Provide for the Accommodation of Necessitous Cases.

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To Provide for the Removal of the Sick, or of other Occupants of the same premises where the Sick are.

PRECAUTIONS AGAINST THE DISEASE WHICH EACH INDIVIDUAL MAY TAKE FOR HIMSELF, OR THE HEADS OF FAMILIES OR ESTABLISHMENTS FOR THOSE UNDER THEIR CHARGE.

*(From the Notification of the General Board of Health, September 20, 1853.)*

*Cleanliness and Ventilation.*—The first in importance are personal and household cleanliness, and the freest ventilation of living and sleeping rooms with pure air; the purity of the air we breathe being even more essential than the wholesomeness of food and drink.

*Premonitory Symptoms.*—When the disease has actually broken out and become epidemic in any district or locality, then the one essential precaution is not to neglect for a single hour any degree of looseness of bowels. This symptom being commonly without pain, and so slight that it is difficult to conceive that it can be of the smallest consequence, naturally leads to neglect, and this neglect has cost the lives of thousands. Were any additional proof of this required, it would be found in the events that are now occurring at Newcastle and Gateshead; all the medical men there bear testimony that premonitory diarrhœa is all but universal, and that life depends on instant attention to this symptom.



*Regulation of Diet.*—The measure of precaution next in importance relates to the proper regulation of the diet. Great moderation, both of food and drink, is absolutely essential to safety during the whole duration of the epidemic period; an act of indiscretion has been often followed by a severe attack; intemperance at such a time is fraught with the most extreme danger. During the epidemic of 1849, sudden and fatal attacks of the disease followed immediately on the indulgence of habits of drinking after the receipt of weekly wages. The intervals between the meals should not be long; Cholera being uniformly found to prevail with extraordinary intensity among the classes that observe the protracted fasts common in eastern and some European countries.

*Fatigue.*—The utmost practicable care should be taken against fatigue, which is a very powerful predisposing cause of the disease. Employers and persons engaged in laborious occupations should endeavour, as far as possible, so to arrange the amount and time of work, as to avoid physical exhaustion.

*Warm Clothing—Damp.*—Warm clothing is of great importance. During the present epidemic in Hamburgh, it has been found that incautious exposure to cold and damp has brought on an attack as rapidly as improper food or excess. This precaution against damp is rendered doubly important by the peculiarity of the present season. Long-continued and excessive rains have, in many places, surcharged the ground with moisture, especially undrained and low-lying districts, placing, in many instances, the land contiguous to towns, and beyond the usual range of town drainage, almost in the condition of marshes.

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The exhalations arising from a surface thus saturated often with water, holding decomposing matter in solution, spread to the towns and affect the inhabitants, however well drained the immediate sites of the towns may be. The General Board were so apprehensive that disease would be extensively produced by this unusual and dangerous state of a large portion of the country (an apprehension which was subsequently realized by the breaking out of disease, allied in character to Cholera, in sixty towns), that in their notification, issued in December, 1852, they represented to local authorities that this calamity afforded a special occasion for administering extraordinary assistance to the poor, to enable them to keep large fires in their rooms, to protect themselves from cold and damp by warm clothing, to sustain their strength by a solid and nutritive diet, and to counteract the predisposition to disease induced under these peculiar circumstances, by suitable tonics and other remedies, under medical direction.

*True Charity.*—This representation was made when there was a threatening of the return of Cholera; it is now amongst us, and the General Board would remind the affluent that the opportune supply to their poorer neighbours and dependents of wholesome food, warm clothing, and bedding, and even such remedies (to be always in readiness) as their medical attendant may recommend for looseness of bowels, is charity in the truest sense, and may be the means of saving many lives. It is also much to be desired, and the General Board would strongly recommend, that the higher classes should co-operate with the Clergy, who have done so much to promote the object of the Legislature under the Public Health



Act, in making frequent visits among the poor, and impressing upon them the importance of following the instructions here laid down, *with reference to which there is a perfect accordance between the College of Physicians and the General Board of Health.*

## LIME-WASHING AND CLEANSING OF HOUSES.

*(From the Evidence of Mr. Alexander Ramsay, of Edinburgh, published by the General Board of Health.)*

Mr. Ramsay states:—The dwellings of a very large proportion of the poor are mere dunghills, and the salutary effects of cleansing the closes and other places where they live, out-doors, are in a great measure neutralized by the filth which prevails within. With the view of carrying the cleansing into the interior of such houses as seemed to be most in need of it, and particularly where fever and other epidemic diseases had been recently prevalent, the Cleansing Committee of the Police Commissioners of Edinburgh authorized Mr. Ramsay to cause the walls of any stairs or closes, which might seem to require it, to be washed with quicklime; and where whitewashing and fumigation within the houses were necessary, to appoint such persons, and to purchase such implements and materials, as were needful to carry out their object.

By the aid of two men, and with no other implements than a common pail and a painter's whitewashing brush, Mr. Ramsay has shown that a second

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or third-rate tenement, containing two or three apartments, may be effectually lime-washed at an expense not exceeding from 9*d.* to 1*s.* per tenement. "The solution of lime in water," says Mr. Ramsay, "is very quickly applied, and when the workmen become accustomed to it, which they soon do, they put the inmates to very little trouble, and do not occasion the usual splashing about of the material, the fear of which creates an aversion to the operation in the minds of indolent and infirm persons, not always to be overcome. When one or two houses have been cleansed and lime-washed, many of the neighbours, gratified with the fresh smell of the lime, and its light and agreeable effect on the black and dirty walls, apply to have their houses also washed; and others, seeing with how little inconvenience to themselves it is accomplished, and its agreeable effects, on their permission being asked, very rarely refuse."

Each workman should be provided with a whitening brush, a scavenger's broom, and a shovel. A pail and a wheelbarrow should be furnished to every two workmen. Not more than ten men should be placed under the charge of one overseer. The men should work two and two, every two men having a pail for their joint use. In the cleansing of dwelling-houses, as many hands should be set to work in one apartment as can conveniently and efficiently be employed, in order that the work may be quickly performed, and that the occupants may not be subjected to the annoyance of unnecessary delay in the execution of the work. Women may be employed in washing the floors, furniture, or clothes; but in every case they should be under the charge of an intelligent and respectable man, who should be accountable for their conduct. They should on no account be left alone.



Fumigation being a process not safely performed except under the eye of a medical man, has been intrusted to the surgeon of the police establishment. The composition for fumigating consists of one part of black oxide of manganese to four of muriate of soda. For an apartment of ordinary size, about four ounces of this mixture is laid upon a common earthenware plate or basin, which is usually placed in the middle of the apartment, and about two ounces of sulphuric acid poured over it. The doors and windows being carefully shut, and the chlorine gas instantly disengaged, every crevice in the apartment is quickly filled. In eight or ten minutes the windows and doors are again opened; and if there are a number of houses requiring fumigation in the same neighbourhood, the process goes on nearly simultaneously in the whole, so that one person may fumigate a very large number within an hour.

## CHOLERA NOT CONTAGIOUS.

(*From the Notification of the General Board of Health, October 5*, 1848.)

The extent, uniform tenor, and undoubted authority of the evidence obtained from observers of all classes, in different countries and climates, and amidst all varieties of the physical, political, and social conditions of the people, appear to discredit the once prevalent opinion that Cholera is in itself

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contagious; an opinion which, if fallacious, must be mischievous, since it diverts attention from the true source of danger, and the real means of protection, and fixes on those which are imaginary; creates panic; leads to the neglect and abandonment of the sick; occasions great expense for what is worse than useless; and withdraws attention from that brief but important interval between the commencement and the development of the disease, during which remedial measures are most effective in its cure.

Although it is so far true, that certain conditions may favour its spread from person to person, as when great numbers of the sick are crowded together in close, unventilated apartments, yet this is not to be considered as affecting the general principle of its non-contagious nature; nor are such conditions likely to occur in this country; moreover, the preventive measures founded on the theory of contagion, namely, internal quarantine regulations, sanitary *cordons*, and the isolation of the sick, on which formerly the strongest reliance was placed, have been recently abandoned in all countries where Cholera has appeared, from the general experience of their inefficiency.

The evidence also proves, that Cholera almost always affords, by premonitory symptoms, warning of its approach, in time for the employment of means capable of arresting its progress. If, indeed, in certain situations, as where there is an unusual concentration of the poison, or in certain individuals who are peculiarly predisposed to the disease, the attack may sometimes appear to be instantaneous, still the general conclusions, that Cholera is not in itself contagious, and that it commonly gives distinct warning



of its approach, are two great facts well calculated to divest this disease of its chief terrors, and to show the paramount importance of the means of prevention, so much more certain than those of cure.

## PRECAUTIONS AGAINST THE CHOLERA.

### TO CAPTAINS OF MERCHANT SHIPS, STEAMERS, AND COLLIERS.

*Looseness of Bowels.*—Guard against looseness of bowels and purging. Before a person is attacked by the Cholera, he is almost sure to have for a day or two, or for several days, or only for a few hours, some looseness of the bowels or purging. There is often no pain; but this must not put any off his guard, as to the importance of this warning. The captain or mate ought therefore, without alarming the men, to inquire of the crew daily, whether any of them have looseness or purging, as this might by chance become worse. If a man is purged let him go to bed, be kept quite warm; and if he is cold, apply bottles of hot water, or bags filled with hot salt or bran, to the stomach and feet. Give him immediately eight drops of laudanum in a wine-glass of hot and weak brandy and water; give the man this every two hours as long as he is purged. The same dose should be given night and morning for one or two days after the purging is stopped.

*Seizure with Cholera.*—What is to be done if a man is seized or taken with Cholera? This comes on with cold, giddiness, sickness, vomiting, and purging of what looks like dirty water, or rice and water.

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Let the man get into a hot bed; cover him well with blankets; apply bottles of hot water, or bags filled with hot salt, sand, or bran, to the stomach, spine, and feet; be sure he is not exposed to a draught or cold, the object being to put him into a sweat. Put a large poultice of mustard and vinegar over the stomach, and keep it on fifteen or twenty minutes. Give the man fifteen drops of laudanum, with a teaspoonful of brandy (or whisky or other spirit, in the absence of brandy) in a little hot water; a little ginger or cloves may be added. This medicine may be given every hour for six hours, but not longer; it must then be left off. When the man begins to sweat give him some hot tea, with a teaspoonful of brandy in it, and keep him warm in bed.

*Instant Medical Advice.*—When the ship is in port, medical advice should be got as soon as possible, in any case of seizure, as the delay of even one hour may cause death.

*Food.*—All kinds of fruit, salads, cucumbers, celery, and pickles, had better be avoided; also oysters, lobsters, crabs, mussels, or other shell fish. The most wholesome articles of food are well-baked bread, good biscuits, rice, oatmeal, peas, and good potatoes: solid food is better than fluid, and therefore at this time it would be a good thing to give the crew beef and mutton instead of soup.

*Spirits and other Drinks.*—On the Danger of Spirits, Corn-Brandy, Wine, Beer, &c.—It is a very common notion among sailors and other people that brandy, whisky, rum, wine, and the like, are good as a protection against the Cholera. This is a total and fatal mistake: in every Country and town where the Cholera has broken out, drunkards, and those who drink



freely, have been the first and greatest sufferers from the disease; temperate men usually escape, drunkards usually die. It is, therefore, earnestly hoped and requested, that captains will warn their crews against all excess in drinking, more especially warn them from taking corn-brandy or gin, which often acts as a poison. They should also not drink any of the white and brown beer sold at Hamburgh and other ports, especially if it is sour. The Elbe water is bad, and likely to purge; therefore it would be better to use water brought from England, and captains are recommended to take in a supply accordingly.

*Wet and Cold.*—Wet and cold should as much as possible be guarded against by warm dry clothing and stout shoes. A thick flannel belt or bandage around the stomach and loins is a good defence for sailors. When they go to bed, if the shirt is damp or wet, they should change it, and put on a dry one. They should not stop out at night on shore. Many sailors who have been drinking at Hambro'-bar, and lying about on Sunday night, have been seized on Monday with Cholera, and died in a few hours.

*Cleanliness and Ventilation.*—Nothing is of greater importance as a protection against Cholera than cleanliness and a good supply of pure air. It is therefore the duty of captains to take all the means in their power to improve and keep up the health and strength of their crews, who are placed under their care and protection. The owners are particularly requested, on the return of their ships to English ports, to see these instructions complied with. The forecastle should be frequently cleansed, and the hatches be opened in fine weather, so as freely to admit the fresh

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air. The forecastle should be whitewashed. To sweeten the ship, bleaching salt or powder (called also chloride of lime), which is very cheap, and may be got at any druggist's, should be mixed with water, and poured down the pumps; it should also be sprinkled about the forecastle and in the cabins. Keep the ship as free as possible from bilge-water, using the pumps daily for this purpose, because it prevails most when ships are very tight, and open the hatches to purify the hold. All the bedding should be kept well dried, and be brought on deck in fine weather, and well aired.

*No Danger in Nursing the Sick.*—MARK THIS WELL.—The Cholera is not Contagious; so no one need be afraid of catching it. There is no danger in waiting on and nursing any one of the crew who may unfortunately be attacked.

The Captains of all vessels trading to the port of Hamburgh are hereby informed that proper medicine, ready made up for use, and with plain directions, can be procured at prime cost of all the shipbrokers and agents for English ships in Hamburgh, and they are hereby requested to provide themselves with the same, in order to afford all the protection to their crews which the circumstances of the case admit.

*Signed, by Order of the General Board of Health of England,*

CHAS. MACAULAY,
*Secretary.*

*September 20th*, 1853.

REED AND PARSON, PRINTERS, PATERNOSTER ROW, LONDON.

# HOW TO MEET CHOLERA:

## A Guide

FOR PARISH OFFICERS, SANITARY COMMITTEES, CLERGYMEN, ETC.

ON THE

MEANS TO AVERT CHOLERA, OR TO ALLEVIATE ITS SEVERITY WHEN PRESENT.

TOGETHER WITH THE MOST RECENT NOTIFICATIONS, REGULATIONS, ETC., OF THE GENERAL BOARD OF HEALTH, AND THE INSTRUCTIONS ISSUED BY THE ROYAL COLLEGE OF PHYSICIANS, ON THE TREATMENT OF CHOLERA, ETC.

BY JAMES J. SCOTT,

OF THE MIDDLE TEMPLE, BARRISTER-AT-LAW,

AUTHOR OF "LAW AND PRACTICE OF ELECTIONS OF LOCAL BOARDS OF HEALTH" "BURIAL ACTS: 1850, 1853 AND 1854, WITH ABSTRACT," ETC. ETC.

Second Edition,
REVISED AND ENLARGED.

LONDON:
KNIGHT & COMPANY, 90, FLEET STREET,
PUBLISHERS BY AUTHORITY TO THE GENERAL BOARD OF HEALTH, AND THE POOR LAW BOARD.

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LONDON:
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PATERNOSTER ROW.

## ADVERTISEMENT TO THE FIRST EDITION.

Upon the last visitation of Cholera in this country, no fewer than 70,000 persons fell victims to that terrible disease; a mere list of them (it has been calculated) would fill an 8vo. volume of about 2,500 pages! The disease has for some months been making rapid progress towards England; and it has now (Sept. 1853) broken out with fearful severity at Newcastle, and several other places—in a much more malignant and fatal form than heretofore.

It has therefore been deemed expedient to issue, without delay, the following little work, containing directions (collected from various authorities on the subject) to serve as a guide to all who may desire to know what to do, to prevent, if possible, the approach, or at least the localization, of Cholera in any district, and also to inform them how to act in case that dreaded disease should invade any place.

The information is collected under various heads, the latest Regulations, Notifications, &c., of the General Board of Health being sub-divided and arranged according to subjects. The language is everywhere rendered as simple and plain as possible; and with as little of the formality of official and professional documents as perspicuity would allow. The Editor has, with all manageable expedition, prepared this little work in the earnest hope that it may prove useful, and furnish a mass of practicable information in an easily accessible and popular form. The importance of having IMMEDIATE



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*recourse to medical assistance*, in case any threatening symptoms arise, cannot be too strongly urged upon all. Where advice is given in the following pages for the treatment of the disease, it has been selected from the best available authorities, and is intended merely to guide those who may not be able to obtain the early aid of a doctor on the spot. Under such circumstances, and in remote country places, the directions may be safely followed until professional consultation is procured. But this, it should be remembered, ought always to be secured, wherever and as early as possible.

## PREFACE TO SECOND EDITION.

A few days sufficed to exhaust a large impression of this little work. This is, at any time, a gratifying circumstance to a writer, but it is peculiarly so to the compiler of this pamphlet, as he prepared it in the full belief that it was a *desideratum*, in the present hazardous state of the public health, and with the earnest trust that it would do some good. The present edition has been carefully revised and enlarged. Some of the less useful matter has been withdrawn, and considerable additions, of a directly practical nature, have been made. The compiler has been pleased to learn, that the contents of the book have in many quarters served to allay needless alarm, while they have secured increased confidence in the success of enlightened and effective sanitary improvements.

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# HOW TO MEET CHOLERA.

## MEASURES OF PREVENTION AGAINST CHOLERA EFFECTIVE AGAINST ALL EPIDEMICS.

With reference to the measures of prevention proved to be the most effectual against this pestilence, the General Board of Health thus state (8th Official Circular) "the two great results of the experience of this epidemic in this country; namely, first, that wherever it prevailed, its principal, nay, its almost exclusive seats and subjects were the seats and subjects of *ordinary* epidemics; and secondly, that wherever the common localizing conditions of ordinary epidemics had been *removed by sanitary improvements*, so that typhus and other zymotics had either ceased altogether or recurred but rarely, there epidemic Cholera was unable to establish a footing, and often even to number a single victim.

"From inquiries recently made by the General Board into the present condition of the former seats of this pestilence, it appears that many of the localities in which, on its last visitation, it raged with the greatest severity, have been so much improved by better drainage, by better arrangements for the rapid and complete removal of refuse, by surface paving and flagging, and by the introduction of a more abundant supply of purer water, that the ordinary epidemics by which they were previously devastated have been diminished in a remarkable degree. From the reports of the medical



inspector of the Board (Dr. Sutherland), who (in the latter part of 1852 and the early portion of 1853) made a special examination of the principal Cholera and Fever localities in the metropolis, it has appeared that material improvements have been effected in several places which had obtained an unhappy notoriety for their filthy condition, and their excessive sickness and mortality."

It is a subject of congratulation and comfort to know that wherever sanitary improvements have been properly carried out, there a corresponding alleviation of zymotic disease has been experienced.

In all such cases (to quote the same Official Circular), "it has been proved that the diminution of zymotic disease has been proportionate to the extent of these improvements; and that in the instances in which such improvements have been tolerably complete, there has been almost an absence of this class of diseases. Experience, therefore, warrants the conclusion, that, in as far as these improved localities have become exempt from ordinary epidemics, they will resist the invasion of any extraordinary epidemic by which they may be attacked, and that, consequently, were Asiatic Cholera to revisit these, its former seats, it would be unable again to establish itself in them, since the conditions which formerly favoured its localization have ceased to exist, and the epidemics which then preceded and prepared the way for it have been nearly banished."

It should, however, be remembered that improvements which have had such singularly happy results, and which have been effected in particular localities, might be achieved generally; and special authorities and powers are created for this express purpose by the Acts under-mentioned.

Where the Public Health Act is not in force, the Nuisances Removal and Diseases Prevention Acts invest highly important though limited powers in Town Councils, or, where there are no Town Councils, in Improvement Commissioners; and, failing these, in Commissioners of Sewers and Boards of Guardians, for the general purposes of Cleansing and the Removal of Nuisances.

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## ECONOMY OF EARLY AND EFFECTIVE MEASURES.

Nothing can be more erroneous or ill-founded than the notion that effective and even extensive measures of precaution against Cholera are costly. A little consideration will prove that they are really the best economy, even in a money point of view, totally independent of the higher points in which the subject should be regarded.

"The most common argument against the immediate and energetic adoption of the preventive measures directed by the General Board of Health, is their expense. (Off. Cir. 7.) The epidemic is considered by the ignorant as an evil with which it is useless to grapple; and among the better informed a false economy, which has in some instances led to the most fatal results, has been the ground of resistance to measures which were instantly necessary to save life. But it should be known that parochial expenditure cannot be avoided during a season of public calamity like the present. Money must be spent either in *saving life or in the maintenance of pauperism, widowhood, and orphanage.* In this case, economy is on the side of humanity, and the most expensive of all things is to do nothing."—*Ibid.*

In support of these statements, it may be observed that one parish in the metropolis was, in the course of a few days during the Cholera visitation in 1848-9, burthened with 61 cholera widows and 226 cholera orphans, who must for years past have been, and will, doubtlessly, for years yet to come, remain a costly burthen on the parish. In a small court in Bishopsgate-street,—Peahen-court, in the parish of St. Ethelburga,—the Cholera in 1848-9 soon produced 1 widow and 12 cholera orphans, whose maintenance, until they are able to provide for themselves, will cost the parish, according to the estimate of a competent authority, not less than 420*l.*; while a timely expenditure of 30*l.* in putting the court in a sanitary condition would probably have prevented the occurrence of a



single case of Cholera. The cholera funerals in the metropolis had, during that one visitation and up only to August, 1849, cost a public expenditure of not less than 50,000*l.* And what further sacrifices had it not occasioned of grief, anguish, disappointed hopes, distressed families, and reduced circumstances!

## PREDISPOSING CAUSES AND CHIEF LOCALITIES OF CHOLERA.

A knowledge of the chief predisposing causes of Cholera, so far as science has yet been able to trace them, cannot but prove of service, as a means of removing, or at the least mitigating, some of those causes. In one of their Notifications, (1 Off. Cir.) the General Board of Health thus remark upon the subject:—

"The chief predisposing causes of every epidemic, and especially of Cholera, are damp, moisture, filth, animal and vegetable matters in a state of decomposition, and, in general, whatever produces atmospheric impurity; all of which have the effect of lowering the health and vigour of the system, and of increasing the susceptibility to disease, particularly among the young, the aged, and the feeble.

"The attacks of Cholera are uniformly found to be most frequent and virulent in low lying districts, on the banks of rivers, in the neighbourhood of sewer mouths, and wherever there are large collections of refuse, particularly amidst human dwellings. In a proclamation issued for the protection of the population of the Russian empire, the important influence of these and similar causes has been recognised, and the practical recommendations founded thereon are 'to keep the person and the dwelling-place clean, to allow of no sinks close to the house, to admit of no poultry or animals within the house, to keep every apartment as airy as possible by ventilation, and to prevent crowding wherever there are sick.'"



will not, we venture to predict, be able to withstand the storm of reprobation which is justly due to men who, through weakness and incapacity, have betrayed their country.

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## WATER—DANGER OF POLLUTION OF WELLS.

Mr. R. D. Grainger, of St. Thomas's Hospital, in a Report on the state of Leeds, early in 1853, speaks thus of the dangers likely to arise from the leakage of cesspools into wells. The subject is of such importance that it is well worthy of careful attention:—

"The Cesspools, which are often constructed purposely without mortar, allow their liquid contents to escape into the numerous fissures in the rock, which, being associated with impermeable strata, carry, like so many pipes, the matter into the Wells situated on the lower levels. Large private residences of the yearly value of 60*l.* or 80*l.*, were pointed out to me where this percolation had occurred, rendering the water unfit for use. The same evil, I was informed, had occurred at Potter Newton, another township. During the Cholera of 1849 many instances came to my knowledge, in which most destructive attacks were directly traced to the use of well-water thus polluted; which, being swallowed, acts as a powerful poison, inducing Diarrhœa, or, when the epidemic influence is present, Cholera. That the health of the labouring classes suffers from this defective drainage is proved by the medical evidence I have received. Cholera prevailed in 1849; and up to the present time diarrhœa, dysentery, and fever exist. Last year, indeed, according to Mr. Bishop, a gentleman in extensive practice, scarlet fever of the most malignant kind prevailed at Headingley, and *caused more deaths than the Cholera.* Mr. Bishop adds, 'these attacks occurred in exactly the same localities as the Cholera of 1849; and if the epidemic should again visit England, he apprehends these places, if not improved, would again suffer.'"

## WHAT IS "A NUISANCE"?

It is very widely believed that to constitute anything a



*nuisance* it must be proved to be dangerous or injurious to health. This is an erroneous notion, and the absence of any legal foundation for the opinion has been clearly pointed out (G. B. Off. Cir. No. 8) in the following passages, which may be found useful to guide persons in dealing with any offensive nuisances in their neighbourhoods:—

"The law considers as a nuisance whatever causes inconvenience, as well as whatever causes damage. Thus every thing is a nuisance which corrupts the air or gives rise to offensive smells; a public nuisance, if the source of offence be so situated as to affect the public, as, for example, near a public highway or in a crowded neighbourhood; a private nuisance, if it extend only to the inhabitants of a particular room or a single house.

"The law is explicit on the point, that injury to health is not necessary to constitute a nuisance. 'It is not necessary,' says C. J. Abbott (R. *v.* Neil, 2 C. & P.), 'that a public nuisance should be injurious to health. If there be smells offensive to the senses it is enough, as the neighbourhood has a right to pure and fresh air.'

"And on the question of how far the presence of other nuisances can be considered to justify the maintenance of the particular one complained of, he remarks, 'It has been proved that a number of other offensive trades are carried on near this place, knackers, makers of kitchen stuff, &c.; but the presence of other nuisances will not justify any one of them, as the more nuisances there were, the more fixed they would be. However, one is not the less subject to prosecution because others are culpable. The only question, therefore, is this—'*Is the business, as carried on by the defendant, productive of smells offensive to persons passing along the public highway.*' Hence the statute draws a manifest distinction between a cause of complaint being a nuisance, and a cause of complaint being injurious to public health.

"Every public nuisance, it may be remarked, includes a private nuisance and proof that the cause

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of complaint is a public nuisance would support proceedings under the statute.

"These powers are obviously intended to apply to a class of evils which, though subordinate to those for which the only remedies are efficient drainage and an abundant water-supply, still exert a most important influence in the localization and spread of epidemic diseases. By the general and vigorous exercise of these powers to the extent to which local authorities are everywhere empowered to enforce them, many fruitful sources of disease might be immediately diminished or removed, particularly in the worst localities, and a great improvement effected in the public health."

## DANGEROUS LOCALITIES—VISITATION OF.

The following suggestions as to the Visitation of Dangerous Localities may prove of use. They are extracted from the General Board of Health's first Official Circular:—

"In several districts, the police, in going their usual rounds, have been employed with great advantage in reporting daily as to the houses, courts, alleys, passages, and streets within their district most in need of cleansing; as to the carelessness or neglect of the scavengers in the performance of their duties, and as to the existence of nuisances of various kinds. The Boards of Guardians, or Special Committees formed out of their body, are therefore recommended to associate themselves with Special Committees of Town Councils, who, by their Watch Committees, have the control of the police, and to engage for these purposes the valuable services of this force.

"Highly important services have been rendered by the parochial clergy and other ministers of religion, in association with lay committees, for the purpose of maintaining a system of house to house visitation in the more depressed districts; and, wherever it is practicable, the Boards of Guardians are recommended to associate with a special committee of their own number (who for the time may be exempted from ordinary duties), the clergy of the respective parishes, and the ministers of other religious denominations, and to call upon the medical and other union officers to give their aid to this committee."



The Directions and Regulations issued by the Board contain provisions upon this subject, which may be thus given in substance:—

Local Authorities are forthwith to order the Clerk to the Guardians to make out from the Medical Officers' books or other sources of information, a list of the places within the Union, &c., where cases of Cholera, Diarrhœa, typhus fever, or any epidemic or endemic disease, have lately been frequent; and to give a list to the Medical Officer of each district to which it shall relate. The Medical Officer is to visit such places, and examine the houses as to cleanliness, or as to any existing predisposing and *removable* causes of disease likely to affect the inmates.

The Medical Officer is also to inquire into the health of the inhabitants of all such places, and into that of the children (in schools); of workpeople, and of the inmates of common lodging-houses. Where he finds any case of diarrhœa or any premonitory stages of epidemic disease, his duty will be to treat or direct the treatment of it *at once*.

Any medical officer may certify (to the Guardians) all places in a state dangerous to health, or needing frequent cleansing as preservation against disease, and all dwelling houses in a filthy and unwholesome condition, and any such nuisances and matters injurious to health as ought to be abated, cleansed, and removed under these regulations.

All Local Authorities who are intrusted with the care and management of streets, public ways and places, are ordered to see to the effectual and continued cleansing of all such of the streets, courts, alleys, &c., and public ways and places, under their respective care and management, as shall be certified by the Medical



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Officer to be in a state dangerous to health, or to require frequent and effectual cleansing by way of precaution against disease. They are also bound to cause all filth, ordure, and nuisances to be removed therefrom.

Where such streets, &c., or places to which any houses or tenements adjoin, have not been entrusted by law to the care of any local authority, but have been certified by the Medical Officer to be dangerous to health, or to require frequent cleansing, every occupier of any house, &c., must keep every part of the street, &c., sufficiently cleansed. These works of cleansing, &c., must be done by effectual washing or otherwise, and with the use of fluids or substances for preventing noxious effluvia during the operation, when the Medical Officer, &c. shall direct and prescribe them to be used.

Where, by neglect of the local authority, or from the poverty of the householder, such works are not now done, the Guardians (or Overseers) are ordered by the General Board of Health's Regulations to do all that is required.

## PREVENTION OF ACCUMULATIONS OF FILTH.

The Local Authorities having first succeeded in removing existing accumulations of filth, means must be taken to prevent their being formed again. For this purpose the General Board of Health (8th Off. Cir.) suggests that it will be worth while to collect and remove the refuse daily, instead of at longer intervals. It has been shown that increased frequency of collection causes no addition to the bulk of refuse to be carted away, and that, under proper arrangements, frequent removals need be little more expensive than infrequent removals of larger quantities at more distant periods. The cost, indeed, of collection might be materially diminished by providing moveable dust-bins or boxes capable of holding the usual accumulation between the intervals of the return of the cart. The boxes thus filled may be lifted at once into the cart, so as to avoid



the dust and dirt occasioned by filling the dust into baskets, and throwing the contents into the cart in the street; arrangements being made for changing the full receptacle for an empty one, at such short intervals as may be found convenient. These dust-bins may be advantageously provided by the local authorities, otherwise they will not all be of convenient or uniform size, and cannot be packed so closely in the cart in which they are carried.

The General Board of Health in their latest Directions have ordered that—

1.—Wherever any dwelling-house is in a filthy and unwholesome condition; or

2.—Where, upon, adjoining to, or near any premises, there is a foul and offensive drain, ditch, gutter, privy, cesspool, or ashpit, or any drain, ditch, gutter, privy, cesspool, or ashpit which is a nuisance, or injurious to health; or,

3.—Any swine, or accumulation of dung, manure, offal, filth, refuse, &c., is kept, so as to be a nuisance, or injurious to health; or

4.—Where, in any building used wholly or partly as a dwelling, or underneath such building, any animal is kept so as to be a nuisance, or injurious to health;

The owner or occupier of any such premises (or, if by poverty or otherwise unable, then the Town Council, &c.) must cleanse, whitewash, or otherwise purify the house, or remove the nuisance forthwith.

## PRECAUTIONS IN REMOVING FILTH, &c.

The following advice, as to precautions desirable to be taken in removing accumulations of filth, &c., is extracted from a letter addressed by Dr. J. C. Hall, of Sheffield, to the *Times*, (17th Sept., 1853). It furnishes some very useful suggestions:—

"In cleansing dirty courts, &c., some precautions must be taken lest, in the removal of the heaps of filth, &c., we permit the extrication of the large quantities of

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poisonous gases which exist in all accumulations of decaying animal and vegetable remains. Certain metallic salts—for example, *green or blue copperas, chloride of zinc, nitrate of lead*, or, better still, *chloride of lime*—have been recommended by Dr. Robinson to the authorities at Newcastle. I should give the preference to *chlorine itself*, which can be formed quickly by mixing the black oxide of manganese with some common table salt, and pouring upon this powder the oil of vitriol and water. This, in a liquid form, thrown upon the offensive matters, will, to a considerable degree, remove the dangers incident to the carting away of such accumulations."—(See p. 29, as to Disinfectants, &c.)

## PREVENTIVE MEASURES.—CLEANSING.

### 1. *External Cleansing.*

The preventive measures which may at once be taken under the general powers of the Public Health Act (Off. Cir. No. 8), are those of External and Internal Cleansing; and the places into which these operations should be first carried, are clearly indicated in the Registers of Death, in the Case Books of the Medical Officers, and in the Lists of the Relieving Officers, which show the streets, courts, alleys, houses, and the very rooms in which epidemic diseases have been and are prevailing.

From these sources as full a list as may be practicable should be made of the places where measures of external cleansing are the most urgently needed; and all such places should be actively inspected, with a view to the immediate removal of any existing accumulations of filth, the more complete surface washing, and the emptying of overflowing privies and cesspools. Wherever practicable, these cleansings should be effected by the hose and jet, when everything is washed away rapidly and completely. When there is a constant supply of water at high pressure, all that is necessary is to attach the hose to a fire-plug, and instantly a column of water is obtained with a force not only



sufficient thoroughly to cleanse the pavement, but also effectually to wash the walls of buildings, and the fronts and windows of houses, with the effect of lowering the temperature and producing a grateful sense of freshness, similar to that which is experienced after a heavy thunder-shower in hot weather. Where there is no head pressure, the common parish fire-engine may be used with advantage, and at one-half the cost of the scavengers' sweeping. In all cases *privies and cesspools* should be emptied, not by manual labour, but by the force-pump with the suction-pipe. The whole apparatus necessary for this purpose may be taken down very narrow courts and alleys, and may be worked by hand. In general, *deodorizers should be previously mixed with the night soil.*

With reference to the larger works of cleansing, such as the cleaning out of long lines of ditches, or the removal of large masses of decomposing refuse—works of this kind should be conducted under the superintendence of a person who possesses some knowledge of the nature of the gases evolved; the atmospheric and other conditions that promote their copious evolution; their probable effects on susceptible persons; and the mode of diminishing or averting them, either by the proper use of deodorizing fluids, or by other means. The Medical Officer, who may be expected to be the best informed in these respects, should therefore be required to take the general superintendence of such operations.

The removal or distribution of large masses of decomposing refuse cannot be expected to be effected without some danger; on the other hand there is a certainty of evil, if such matter is allowed to remain permanently near human habitations, while the risk from the act of removal, if it be tolerably well conducted, is but slight, and, at all events, can only be temporary.—(Off. Cir. 2.) (See "Fumigation, Disinfectants," &c., p. 29.)

Whatever provision may be made for the rapid removal of all kinds of refuse from private dwellings, should be extended to stables, mews, slaughter-houses,

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and markets. The constant outbreak and spread of every form of zymotic disease in these places prove that, as commonly kept, they truly deserve the name they have acquired of "fever-nests," especially in crowded localities.—(Off. Cir. 8.)

The General Board of Health in some recent Regulations have ordered the Local Authority in each place frequently to *visit*, or cause to be visited, the several dwellings and places where there may be ground for believing that necessity will arise for executing works of cleansing. Where also from poverty there is any delay in cleansing or purifying the house, or the abatement or removal of any nuisance, and the medical officer shall certify that the same requires immediate attention, and where there is any delay in cleansing any foul and offensive drain, ditch, watercourse, or gutter into which several tenements may drain, the Local Authorities are required to cause such dwelling houses to be cleansed and purified, and any such drain to be frequently cleansed, and the nuisances to be removed, and to do all requisite for that purpose.

2. *Internal Cleansing* (*Lime Washing, &c.*).

With respect to internal cleansing, the General Board have called the attention of Local Boards and other local authorities (in the 8th Off. Circular) to the primary rule of the bye-laws ordained for the regulation of cleansing, namely,—"That all occupiers of premises within the district shall so keep them cleansed that no noxious or offensive smells shall proceed from the same, so as to cause annoyance to neighbours or passers-by." All premises in this condition, and especially all such premises in which any form of fever has actually broken out, whether a private dwelling-house, a common lodging-house, or a workshop, in which a number of workpeople are assembled, should be specially and frequently inspected. To these and all similar places the purifying process of *lime-washing* should be at once applied under the direction of the Officer of Health, &c. The efficacy of this process, in checking the spread of fever, and



likewise in *averting the outbreak and arresting the progress of Epidemic Cholera* has been fully proved. In Edinburgh, Glasgow, Bristol, and other populous towns and cities, the most decisive testimony has been borne to its beneficial effect, obtained at exceedingly moderate cost.

As to the means by and manner in which these and similar works of internal cleansing may be effected, the following directions will prove of service. They are extracted from the second Official Circular of the General Board of Health:—

"Where circumstances will not admit of the employment of able-bodied paupers in such works of cleansing and purification, or where the assistance of paupers would be less efficient than the services of persons accustomed to the work, a sufficient number of men should be engaged for the special purpose of lime-washing and purifying the houses and apartments that may stand in need of such cleansing. Ample experience has shown the efficiency and economy with which operations of this kind may be carried on. By the aid of two men, and with no other implements than a common pail and a painter's whitewashing brush, Mr. Ramsay, inspector of the Edinburgh Cleansing Committee, has shown that a second or third-rate tenement, containing two or three apartments, may be effectually lime-washed at an expense not exceeding from 9*d.* to 1*s.* per tenement. 'The solution of lime in water,' says Mr. Ramsay, 'is very quickly applied, and when the workmen become accustomed to it, which they soon do, they put the inmates to very little trouble, and do not occasion the usual splashing about of the material, the fear of which creates an aversion to the operation in the minds of indolent and infirm persons, not always to be overcome. When one or two houses have been cleansed and lime-washed, many of the neighbours, gratified with the fresh smell of the lime, and its light and agreeable effect on the black and dirty walls, apply to have their houses also washed; and others, seeing with how little inconvenience to themselves it is accomplished, and its agreeable effects, on their permission being asked, very rarely refuse.'"

will not, we venture to predict, be able to withstand the storm of reprobation which is justly due to men who, through weakness and incapacity, have betrayed their country.

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Subsequent experience proved that this cleansing operation is more effectual in the suppression of disease in general, and *Cholera in particular*, than had at first been understood.

"There could be no doubt whatever," says Dr. Sutherland, "that the disease was immediately checked in numerous instances by the use of this measure. Houses with filthy, damp, mouldy walls, are peculiarly liable to become the nurseries of Fever and Cholera; and during the prevalence of the former class of diseases the utility of quicklime-washing had been fully recognised."

This operation was carried into effect to a great extent in the worst parishes of Edinburgh, particularly in the districts affected with Cholera.

"This process," says Dr. Sutherland, "appears to have been mainly relied on as the most effective preventive measure, and I know no city or town where it was adopted to anything like the same extent. It was in Edinburgh that the practice was first successfully adopted to put an arrest on the progress of epidemic typhus, and there can be no doubt that it operated as beneficially in diminishing attacks of Cholera in the fever localities.

"In a communication received from Mr. Hay, inspector of the poor of the city parish, he states that in that parish 'the places cleansed by lime-washing and fumigation were 21 closes, 300 houses, 1060 single rooms, 926 passages, and 1130 flights of stairs. The cleansing was done by a staff of men, at the expense of the Board, recovered in a considerable number of cases from the proprietors.'"

The same results (says the General Board of Health in their Report on Cholera) were obtained at Bristol, where there are notorious fever localities, which it is stated—

"Were at once dealt with in compliance with the advice of the General Board of Health. A whole street of fever-courts was thoroughly cleansed and lime-washed, so that on comparing its condition with what it formerly was, the locality could hardly be recognised. All streets requiring constant attention were reported regularly to the proper authorities, and were preserved in a good



sanitary condition, so far as the removable causes of disease were concerned. Mr. Goldney reports the results of these measures as follows:—

"'The lime-washing operations were continued throughout the whole time of the epidemic, and certainly obtained immunity from attacks of Cholera, even in the most notoriously unhealthy districts. Nearly the whole of a large fever-district was washed prior to the appearance of the Cholera, and escaped.'"

Dr. Sutherland expresses his full conviction that one reason why the deaths from Cholera in Manchester were not, during the outbreak of 1848, more numerous, was the great extent to which lime-washing and house cleansing was carried by the local authorities.

The following plain practical advice as to the best mode of keeping the interior of houses healthy is well worthy of attentive perusal.*

"Look to the inside of your dwelling, as well as outside, to get rid of Nuisances. Are the walls and ceiling dirty or mouldy? at the cost of a shilling or two they may be lime-whited. This has been found one of the most effectual preventives of Cholera. Avoid, if possible, crowding your Sleeping-rooms. If there is a Chimney in a Bedroom, keep it open, and have no chimney-board, or chest of drawers, to stop it up. It would be good to make a hole, three or four inches square, near the ceiling, into the chimney—a very easy ventilator. Get pure air into your rooms by every possible means, and get rid of the foul air in the most effectual manner. If there is a constant offensive smell within your dwelling, which other people as well as yourself notice, be sure that there is danger at hand; and never rest till you have ascertained the cause, and have got it removed, as far as possible. Complain to the landlord; if he neglects you, complain to those who have to enforce 'The Nuisances Removal Act.' If you cannot get the Nuisance removed, you ought to prepare to remove from the Nuisance. If you go to other Lodgings or Houses, go to those where

* Plain Advice to All during the Visitation of the Cholera. (Published by Knight & Co., London.)

will not, we venture to predict, be able to withstand the storm of reprobation which is justly due to men who, through weakness and incapacity, have betrayed their country.

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there has been no fever. There are houses, with no fault of construction, that are always disagreeable to the senses. They are the abodes of sluttishness—the forerunner of disease. The person is seldom clean, when a dwelling is dirty. Personal cleanliness and house cleanliness are both health-givers, and are of vital importance when the elements of disease and death are around us."

## PROVISIONS AS TO COMMON LODGING-HOUSES.

It may be of material service to call the attention of Local Authorities to the greatly increased powers conferred on them with regard to the regulation of Common Lodging-houses. The Act of Session 1853 (16 & 17 Vict. cap. 41) directs that all such houses *must* be registered before being used, and must be held by registered keepers alone. The registration of any common lodging-house may, moreover, be refused, if the keeper does not produce a certificate of character from three householders of the parish. As to the Supply of Water of such places, the Act also provides that wherever it may appear to the Local Authorities that a common lodging-house is without a proper supply of water, and that such a supply can be furnished thereto at a reasonable rate, they may require the owners or keepers of the house to obtain such a supply. If the notice is not complied with, the local authority may remove the common lodging-house from the register until it is complied with.

Another important provision is that when a person in a Common Lodging-house is ill of Fever or any Infectious or Contagious Disease, the Local Authority may cause him to be removed to an hospital or infirmary, with the consent of the authorities thereof, and on the certificate of a medical officer that the disease is infectious or contagious, and that the patient may be safely removed, and may, so far as requisite for preventing the spread of disease, cause the clothes or bedding to be disinfected or destroyed, and award to the owners



any reasonable compensation for the injury or destruction thereof. Such compensation must be paid out of the poor rates of the parish, the amount of compensation being first certified in writing upon a list of such articles.

Town Councils and other Local Authorities are also required to remove any causes of complaint certified under the Nuisances Removal and Diseases Preventive Act, as existing "in or about" any common lodging-house.

The importance of these provisions will be readily admitted by all who know what fruitful centres and sources of disease some of the worst and densely crowded lodging-houses of our large towns and populous districts are, and long have been. Any effective measures to cleanse and purify them cannot fail to have most valuable sanitary (as well as social) results.

## CHEAP PAVEMENTS, FLAGGING OF COURTS, &c.—USEFUL EFFECTS OF.

A Report on the use of Gas Concrete as a cheap Pavement for Courts, Alleys, and Streets, made to the General Board, contains much useful information. The following passages therefrom will reward perusal. The writer remarks:—

From a recent inquiry in Sheffield, Rotherham, and the towns in the same neighbourhood, (where Yorkshire flagging does not cost complete *one-third* what it costs in the metropolis,) I am able to say that the use of gas concrete is becoming universal for the following purposes:—

1. Public suburban foot-paths.
2. Small squares and court-yards containing cottage houses.
3. Private back-yards of first and second class houses.
4. Stable-yards and back premises of large mansions.
5. Private carriage-drives.
6. Foot-paths in pleasure grounds.
7. To a small extent, but rapidly increasing, in the

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walks in gardens, even when such gardens are only occupied by artisans.

In clay soils a bed of dry absorbent materials,—rubbish,—is usually made, varying in thickness from six inches for a carriage-way, to three inches for a foot-way. Upon this the concrete is laid from six inches to one and a half inch thick, according to the strength of road surface required. In gravelly and dry soils no bedding would be required,—at least for court-yards or foot-ways.

The solid materials for the concrete may be the best that the immediate locality affords, and should be quite free from moisture, or the tar will not adhere.

For strong public carriage-ways the stone commonly used for macadamizing, and broken to the same size, will generally be the best. In some instances the concrete has been spread in two layers, the second broken somewhat smaller than the first. For the ordinary purposes of foot-paths and court-yards, small gravel, such as is used for foot-paths in the suburbs of London, is the best material that could possibly be adopted.

In the towns to which I have alluded, and others with which I am acquainted, in the north of England, the ashes from steam engines, from iron-works, and even the coal-ashes from the dwelling houses themselves, are used for the purpose.

The work is executed in the best manner complete, and of sufficient strength for any court-yard not used by carriages, at from 9*d.* to 1*s.* per square yard.

For public carriage-ways the Concrete should be formed of the hardest stone available, and the price complete would, of course, depend much upon the cost of such stone, and breaking the same. It may be stated generally, that if the broken stone be provided for the contractor, the work can be well executed at less than two shillings per square yard.

The object of the report, however, is not so much with reference to the public carriage-ways, as to show that a ready and cheap means exists of improving the surface pavement of thousands of the densely-populated, filthy, fever-stricken, and cholera-threatened courts of all our large towns.



"The flagging of courts, back courts, and the passages leading thereto, is a class of improved works recently introduced extensively, in several metropolitan districts and provincial towns, which has been attended with greater benefit than had been anticipated. A surface consisting of earth, or of broken irregular paving stones, is extremely absorbent and retentive of water; it is easily broken into hollows and pits, which form the ready receptacle for all sorts of filth thrown from the houses; it soon becomes so completely saturated with these unwholesome matters that it partakes of the character of a manure heap, and forms, in fact, an extended cesspool, from the whole extent of which noxious vapours are unceasingly given off. It is on such a surface that the children of the poor spend the greater part of their waking hours, covering their clothes and persons with dirt, and inhaling poison with every breath. From this same surface filth is carried into the interior of the house with every footstep, baffling the most strenuous and persevering efforts of the cleanliest woman to keep the floor of her rooms in a state of tolerable decency and comfort. By the mere substitution of a smooth, even, dry, and impermeable surface immediately surrounding the house, a striking change has been effected in the cleanliness of the house itself, in the habits of the inmates, and especially in the appearance and health of the children."—*Official Circular, No.* 8.

Dr. Sutherland has collected decisive evidence of this during his recent inspection of the epidemic localities of the metropolis. The medical officers of these districts concur in stating that this improvement has been followed by a marked *diminution of zymotic disease;* and especially of those forms of it which are chiefly prevalent among children; while a concurrent and very striking change is shown to have taken place in the cleanliness of the houses, in the dress and habits of the people, and in the healthy appearance of the children. The effect has been, indeed, not only to improve the cleanliness of the dwellings, but also that of the lanes and courts themselves, and of diminishing, in a marked

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degree, the outbreak and spread of ordinary epidemic diseases. In Cardiff the medical officer has found an almost entire absence of epidemics in flagged courts, close to others unflagged, from which fever, &c., are never absent.

"The success which has attended this inexpensive and easy improvement, (says the General Board of Health in their 8th Official Circular,) would justify local authorities in procuring some of the cheaper materials for flagging, and proceeding with this operation at once throughout their epidemic localities, without waiting for laying down stone or other pavement, which it may be ultimately found desirable to substitute, after the permanent works have been completed, and all occasion for disturbing the surface shall have ceased."

## PRECAUTIONS AGAINST CHOLERA.

It is very important to householders to know that their first best step will be immediately to have all dung-heaps, and solid and liquid filth of every description, removed forthwith from beneath or about their houses and premises. Though persons long familiarized to the presence of such refuse may not perceive its offensiveness, nor believe in its noxious properties, yet all who desire to secure themselves from danger should labour for the entire removal of filth and the thorough cleansing of their premises; which also the law will require of each person, for the protection of his neighbours, as well as for his own safety.

Next to the perfect cleansing of the premises, *dryness* ought to be carefully promoted, which will of course require the keeping up of sufficient fires, particularly in the damp and unhealthy districts, where this means should be resorted to for the sake of ventilation as well as of warmth and dryness.

From information obtained from Russia, it appears that in some barracks, and in other places in which large numbers of people are congregated, where these conditions have been attended to in a manner that may be equally practised in private houses, there has been a



comparative immunity from the prevailing epidemic.—*First Official Circular.*

Parochial Special Committees, in any locality attacked or likely to be attacked by cholera, would, among other useful purposes, be peculiarly serviceable in communicating information to the poorer classes as to the particular means of prevention within their reach, and as to the urgent necessity, at such a season, not only of personal and household cleanliness, but also of ventilation, and of a careful and temperate mode of living.—*Ibid.*

The following precautions against Cholera have been issued by the General Board of Health, and are at once simple, clear, concise, and valuable:—

(1). Cholera is not so suddenly fatal as is supposed; it comes on with looseness, or bowel complaint, which goes on for some hours, or even for a day or two; *there is often no pain;* but no one must be put off his guard by this circumstance, but must *immediately,* when purging comes on, apply for proper medicine, *by which the disease is usually stopped.* Where Cholera is prevalent in a district, the neglect of this caution for a few hours may be fatal.

(2). Cholera is often brought on by improper diet. Acid fruits and vegetables, unripe fruits and uncooked vegetables, of all kinds, should be avoided.

(3). Cholera is often brought on by excess even of wholesome food. The greatest moderation should be practised both in meats and drinks, always avoiding long fasting. Ardent spirits should be taken only under medical advice. Drunkards always suffer most.

(4). Cholera is often brought on by cold. Wet clothes should be immediately changed; the feet especially should be kept warm and dry. The most violent attacks often come on immediately after incautious exposure to damp foggy night air.

## DIET AND CLOTHING.

"Next in importance to the immediate employment of such remedies, is attention to proper diet and cloth-

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ing. Whenever Asiatic Cholera is epidemic, there is invariably found among great numbers of the inhabitants an extraordinary tendency to irritation of the bowels; and this fact suggests, that every article of food which is known to favour a relaxed state of the bowels should, as far as possible, be avoided. The diet should be solid rather than fluid; and those who have the means of choosing, should live principally on animal food, as affording the most concentrated and invigorating diet; avoiding salted and smoked meats, pork, salted and shell fish, cider, perry, ginger beer, lemonade, acid liquors of all descriptions, and ardent spirits. Great moderation, both in food and drink, is absolutely essential to safety, DURING THE WHOLE DURATION OF THE EPIDEMIC PERIOD. One single act of indiscretion has, in many instances, been followed by a speedy and fatal attack. The intervals between the meals should not be long; Cholera being uniformly found to prevail with extraordinary intensity among the classes that observe the protracted fasts common in Eastern and some European countries.—*First Official Circular.*

Warm clothing is also very desirable, and should be strictly attended to.

"On account of the intimate connexion between the external skin and the internal lining membrane of the bowels, warm clothing is of great importance. The wearing of flannel next the skin is therefore advisable. Recent experience on the Continent seems to show, that it was useful to wear in the daytime a flannel bandage round the body, and this may become necessary in our own country during the damp and cold weather of the approaching season.

"Particular attention should be paid to keeping the feet warm and dry; changing the clothes immediately after exposure to wet; and maintaining the sitting and bed-rooms well aired, dry, and warm." (*Ibid.*)

It may be necessary to add a caution against cold purgative medicines, such as salts, and against drastic purgatives, such as senna, &c., except under special medical direction.



## FUMIGATION: DISINFECTANTS, &c. (INSTRUCTIONS ON).

Fumigation with chlorine gas, under the eye of a medical man, this being a process which cannot be safely conducted except under medical inspection, is performed at an expense of less than two-pence for each room. (Off. Cir. No. 2.)

The following useful practical directions on the use of cheap disinfectants, are from the pen of Mr. P. H. Holland. They will be found to be of great service:—

The risk to be guarded against in all accumulations, and the removal, of filth and decaying refuse, arises both from foul air slowly arising from their gradual decomposition, and that given off for a time more abundantly during the disturbance of removal. The effects of the slow decomposition may be most conveniently guarded against by burying the filth under a sufficient quantity of soil, or by covering it with a layer of soil mixed with charcoal, produced from peat or coal-tar. If there are any ammoniacal vapours, they may be fixed by sprinkling over the soil a little gypsum. The foul air, while the filth is being disturbed, may be guarded against by causing the evolution of chlorine (or sulphurous acid gas, obtained by burning sulphur). Chlorine may be conveniently set at liberty by wetting chloride of lime (common bleaching powder) with oil of vitriol and water. About three pounds of the powder may be placed in an earthenware pan, and one pound of oil of vitriol mixed with two of water being gradually poured on it, chlorine gas will be given off as the acid is added. Caution is necessary, first, in mixing the oil of vitriol with the water, to do so gradually, or the vessel may be broken by the heat produced; and care must be taken to add the dilute acid to the chloride of lime in small quantities at once, or the gas will be given off so quickly as to cause great annoyance to those near it. If enough chlorine is produced as to be distinctly perceived by the smell all about where the filth is, it will be sufficient.

The residue, after the gas has escaped, will be chiefly

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gypsum, and may be mixed with the filth with advantage. The ground on which filth has been lying, may be well wetted with chloride of lime dissolved in water, and mixed with one-third its weight of oil of vitriol.

The above is not the cheapest mode of evolving chloride, but is easier of management than the cheaper methods. Bennett's disinfecting fluid is a very effectual preparation, but it is expensive, as large quantities must be used.

The General Board of Health have just (September, 1854) issued the following valuable recommendations to Guardians in time of Choleraic disease:—

## SHORT RECOMMENDATIONS TO GUARDIANS IN TIMES OF CHOLERAIC DISEASE.

No. 1. Divide your Union amongst Committees of the Guardians.

No. 2. Give your Medical Officers assistance, if you find they require it.

No. 3. Direct your chief attention to places where epidemic diseases most prevail.—Your Medical and Relieving Officers know these places.

No. 4. Look to the cleansing of roads, streets, and courts; and see that Surveyors, Paving and Improvement Commissioners, and others, having by law power to cleanse, carry out their powers.

No. 5. In their default, or when they have no power, yourselves see to the cleansing of such streets, roads, and courts.

No. 6. Appoint a committee for the receipt of complaints of Nuisances, and see that the proper officer attends to such complaints, and reports what he does therein.

No. 7. In all cleansing operations, where foul smells may arise, let disinfectants, such as fresh earth, quick lime, peat, charcoal, chloride of lime, or zinc, be used.

No. 8. Filthy houses should be lime washed.

No. 9. Direct your Medical Officers to report to you any unusual prevalence of bowel complaint or Diarrhœa, and any case of Cholera, in their respective districts.



No. 10. On the earliest appearance of Choleraic disease, assemble your Medical Officers, and carry out, as far as may seem necessary, the minutes of instruction of the General Board of Health as to preventive measures, dispensaries, and medical aid, which minutes have already been supplied to you by that Board.

No. 11. Make known your arrangements for relief by plain hand-bills, freely circulated.

No. 12. Give warning, by hand-bills, of the importance of applying, on the first symptoms of Diarrhœa, to your Medical Officers, for advice and medicine, and that the same will be given gratuitously.

## HOUSE-TO-HOUSE VISITATION.

Upon any outbreak of Cholera, the system of a daily, or even more frequent, house-to-house visitation has been adopted and may be strongly recommended as a most useful measure, for the early detection and prompt treatment of premonitory cases of Cholera—cases which, it should ever be remembered, may be almost invariably cured if taken in hand at once, whereas, if allowed to proceed, may and probably will defy all treatment, and occasion a dreadful death, with but a fearfully brief warning.

"It will be indispensable (General Board of Health, 1st Off. Cir.), on the first outbreak of Cholera, that the Local Authorities should immediately make arrangements for daily house-to-house inspections of the poorer localities in their respective districts; this being the only practical means by which, in the most dangerous situations and among the most susceptible subjects, the existence of the premonitory symptom can be ascertained in time to administer the proper remedies, so as to arrest the progress of the disorder.

"Heads of families, masters of schools and workhouses, proprietors of large establishments and works, such as factories, mines, warehouses, wharfs and docks, should either be their own inspectors, or employ some trustworthy agent to examine daily every person in their employment, and to give at once the proper remedy, if the premonitory symptom should be present."

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The following abstract of the regulations actually adopted by Dr. Sutherland, in Glasgow, in 1848-9, may serve to illustrate the system of house-to-house visitation.

The duties of the district medical superintendent are :—

1. To visit all cases of emergency reported to him by the visitors of his district, or which may otherwise come to his knowledge.

2. To report immediately to the responsible officer charged with cleansing operations, all cases requiring cleansing.

3. To meet the visitors of his district at a stated hour each day, to receive the reports, and to consult with them on the general business of each sub-district.

4. To join at a stated hour each day the whole staff of district medical superintendents, along with the general superintendent, as their chairman. At the aggregate meeting reports of all cases, both of Diarrhœa and of Cholera, occurring during the preceding twenty-four hours, are made up, and a copy of the summary is sent each day to the General Board of Health.

5. To have his surgery open all day for the purpose of dispensing gratuitously to all applicants such medicines as their cases may require.

6. If his house happen to be one of the houses deemed convenient for the purpose, to have his surgery open all night for the use of the legally qualified medical man who may be appointed for the night service, and the senior student appointed to assist him.

A supply of blankets, sand, salt, fuel, &c., is kept at a convenient place in each district for the use of the sick, but no article is given out, except on the written order of the district or general superintendent.

The whole system of the House of Refuge, with its concomitant cleansing of rooms and houses, is enforced.

Notices are sent to each house detailing the arrangements which are from time to time made for the public safety.

The effect of the house-to-house visitation, whenever the agency has been properly brought to bear, has been



that where the disease was secretly forming, and has been immediately placed under treatment, its progress has been arrested, so that it has seldom gone on to developed Cholera. Thus in one instance, out of 13,089 premonitory cases discovered by the system of house-to-house visitation, and reported as having been placed under treatment, only 80 are stated to have passed into Cholera. In another instance, not a single death occurred out of 1380 cases of premonitory diarrhœa brought under early treatment; but when diarrhœa has been neglected until vomiting has come on, the mortality has risen to 7 per cent., and has increased progressively, according to the length of delay, to 39 per cent.; while in instances in which it has not been brought under treatment until the evacuations have become serous, and have been accompanied with cramps, 53 persons have died out of every 100—facts which it has been justly stated establish the unity of the disease and its progressive danger.—(Off. Cir. 6.)

The objects aimed at by the system of house-to-house visitation may be thus summed up :—

1st. The discovery and immediate treatment of every case of diarrhœa, *in localities where Cholera prevails*, and where the patients have not applied at the dispensaries, in order to prevent, as far as possible, the development of the disease.

2nd. To prevent persons who may not apply for medical aid, even in Cholera, from dying without such aid.

3rd. To bring cases of Cholera under treatment, at the earliest possible period of the disease.

4th. To keep a constant medical inspection over affected districts and houses, so as to ensure their being kept in a proper sanitary condition.

5th. To exercise a moral agency over the population, by giving such instructions in regard to cleanliness, ventilation, and personal habits, as may appear needful, and by explaining and enforcing the necessity for immediate application to the dispensaries or medical officers by all parties who may be taken ill during the intervals between the daily visits.—(*Ibid.*)

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## PREMONITORY SYMPTOMS—IMPORTANCE OF ATTENDING TO THEM AT ONCE.

The great importance of *attending* IMMEDIATELY *to premonitory symptoms of Cholera* cannot be too forcibly, or too constantly, urged upon every one. The General Board, in their first Official Circular, strongly impressed this upon all whom they addressed. The following are their admirable remarks upon this subject:—

This premonitory symptom is looseness of the bowels, which there is reason to regard as universally preceding the setting in of the more dangerous state of the disease, though sometimes, where the poison exists in unusual intensity, or the constitutional predisposition is unusually great, the first stage may appear to be suppressed, as occasionally happens in violent attacks of other diseases.

This looseness of the bowels may be accompanied with some degree of pain, which, however, is generally slight; but in many cases pain is wholly absent; and for some hours, and even days, this bowel complaint may be so slight as to appear trifling; so that, without a previous knowledge of the importance of the warning, it might easily escape notice altogether.

It must be repeated, however, that whenever Asiatic Cholera is epidemic, *the slightest degree of looseness of the bowels ought to be regarded* and treated as the commencement of the disease, which at this stage is capable of being arrested by simple means; but, if neglected only for a few hours, may suddenly assume a fatal form.

## REMEDIES FOR PREMONITORY SYMPTOMS.

In all these cases, it is by far the safest and best plan to have recourse to medical advice. Still, in instances where the advantage of such advice cannot promptly be had, or while it is being sought, it will be desirable to pursue the following course, for the treatment of any of the premonitory symptoms already described:—



"The following remedies, which are within the reach and management of every one, may be regarded as among the most useful; namely, twenty grains of opiate confection, mixed with two table-spoonsful of peppermint water, or with a little weak brandy and water, and repeated every three or four hours, or oftener, if the attack is severe, until the looseness of the bowels is stopped; or an ounce of the compound chalk mixture, with ten or fifteen grains of the aromatic confection, and from five to ten drops of laudanum, repeated in the same manner. From half a drachm to a drachm of tincture of catechu may be added to this last, if the attack is severe.

"Half these quantities should be given to young persons under fifteen, and still smaller doses to infants.

"It is recommended to repeat these remedies night and morning, for some days after the looseness of the bowels has been stopped. But, in all cases, it is desirable, whenever practicable, that even in this earliest stage of the disorder, recourse should be had to medical advice on the spot."—*First Official Circular.*

## INSTRUCTIONS ISSUED BY THE ROYAL COLLEGE OF PHYSICIANS.

SINCE the publication of the first Edition of this work, the Cholera Committee of the Royal College of Physicians have issued some plain and very valuable directions "calculated to be of service to the public during the prevalence of Epidemic Cholera, when medical advice may not be immediately at hand, and before such advice can possibly be obtained." They appear to be so admirable, that the compiler takes the liberty of transferring them, *in extenso*, to these pages.

The Committee state, that they deem it right to offer to the public some instructions, "which, on account of an extended 'Notification' having been issued by the General Board of Health, on the 20th of September 1853, may be brief."

The Instructions are that:—

DURING THE PREVALENCE OF CHOLERA,—

1. No degree of looseness of the bowels should be neglected for a single hour. Medical advice should be at once sought when the looseness begins; and, previous to the arrival of a medical attendant, some of the medicines, at other times used for checking diarrhœa, should be taken; for example: the chalk mixture; the compound cinnamon powder; or the compound chalk powder with opium, in doses of from twenty to forty grains for an adult.

2. No saline aperients or drastic purgatives should be taken without the advice of a medical man.

3. Intemperance in eating or drinking is highly dangerous. But the moderate use of vegetable as well as animal food may be recommended; and, in general, such a plan of diet as each individual has found by experience to be most conducive to his health. For any considerable change in the diet to which a person has been accustomed, is seldom advisable during the prevalence of an Epidemic.

4. Debility, exhaustion, and exposure to damp, render the poor especially subject to the violence of the disease. The Committee urge upon the rich the necessity of supplying those in need with food, fuel, and clothing.

5. The extreme importance of removing or counteracting all impurities, whether in the air, water, or soil, as by ventilation, cleanliness, and the free use of the Chloride of Lime or Chloride of Zinc, cannot be too strongly insisted upon.

Lastly, since the Reports made to the College of Physicians show that of the persons who were engaged about the sick in the last Epidemic, the number of those who were attacked by the disease was, in proportion, exceedingly small, *the fear of infection may be practically disregarded.*

The Committee forbear to dwell upon the extreme importance of providing Medical Attendants at Dispensaries for the treatment of the Diarrhœa among the poor: of organizing in every district affected by Cholera what is called the system of House-to-House Visitation;



and of establishing temporary Hospitals for the reception of Patients who cannot be properly treated at their own homes; because these measures have been strongly and properly enforced in the "Notification" published by the General Board of Health.

## TREATMENT OF CHOLERA.

We have already strongly urged recourse being had to medical advice immediately any one is attacked even with the premonitory symptoms. A spark may be easily extinguished, but, if allowed to extend and burst into a flame, it often defies all attempts to master it. Still more impressively must the absolute necessity of calling in medical aid be stated when the symptoms become more urgent and threatening. While medical advice, however, is being obtained, the following course may be resorted to.

If a person is seized suddenly with cold, giddiness, nausea, vomiting, and cramps, under circumstances in which instant medical assistance cannot be procured, the concurrent testimony of the most experienced medical authorities shows that the proper course is to get as soon as possible into a warm bed; to apply warmth by means of heated flannel, or bottles filled with hot water, or bags of heated camomile flowers, sand, bran, or salt, to the feet and along the spine; to have the extremities diligently rubbed; to apply a large poultice of mustard and vinegar over the region of the stomach, keeping it on fifteen or twenty minutes; and to take every half hour a tea-spoonful of sal volatile in a little hot water, or a dessert-spoonful of brandy in a little hot water, or a wine-glass of hot wine whey, made by pouring a wine-glass of sherry into a tumbler of hot milk: in a word, to do everything practicable to procure a warm, general perspiration until the arrival of the medical attendant, *whose immediate care*, under such circumstances, *is indispensable.—First Official Circular.*

It has not been deemed necessary or proper to give instructions for the treatment of the advanced stage,

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from the confident expectation that the proposed arrangements will supply medical attendance to all cases that may reach that condition, by which means the specific symptoms of each individual case will receive their appropriate treatment.

It may, however, be stated here that Mr. E. W. Lane (the well-known eastern traveller) describes the following method of treating Asiatic Cholera, as successfully pursued in Cairo, Constantinople, and India:—

"If the patient have not vomited the poisonous matter which is a characteristic of the disease, and which resembles rice-water, give a tablespoonful of powdered mustard in a tumbler of cold water, as an emetic. After the vomiting (whether produced by the disease or by the above means), within a few minutes give a wine-glass of brandy with ten grains of capsicum (Cayenne pepper) stirred up in it. This generally produces almost immediate relief, and within an hour rest, perspiration, and sleep. In a few cases it was found necessary to give a half-dose of the brandy and capsicum after half an hour or more. A second half-dose was never required, but should it be required, it may be given. No other fluid should be drunk before recovery.

"To accelerate convalescence, it has been suggested that fifteen drops of a mixture of spirit of ammonia and sulphuric ether, in equal parts, may be advantageously given three or four times during the following day.

"The above quantity of brandy and capsicum is for an adult patient suffering a severe attack; in other cases two-thirds or half of that quantity may suffice, as I have proved by experience."

## HOUSES OF REFUGE.

In some very bad instances Houses of Refuge have been found requisite in former visitations of Cholera, and, no doubt, such a plan will, in extreme cases, be useful now, if unhappily the emergency should arise. "There are instances (says the General Board of Health in their seventh Notification) in which the sanitary condition of localities and houses is so bad, and so incapable of instantaneous improvement, that the only means of saving the susceptible part of the population is the temporary removal of the inhabitants of the worst places to *Houses of Refuge* until their own wretched abodes can be cleansed and purified. Experience has shown that, when groups of cases continue to recur in the same houses and localities, the only means of saving human life is the removal and dispersion of the residents. The evidence is conclusive, and is constantly accumulating, of the efficacy of this proceeding, which has recently been put in practice with success in several places where pestilence was decimating the population. Thus, in the small town of Mevagissey, in Cornwall, where the habitations of the poor are closely packed, and where the whole site is described as one mass of filth, which could not be removed in time to avert the most disastrous consequences, the inspector advised the immediate removal of the population. In this instance, there was no local means of providing houses of refuge; but the Board of Ordnance, on application of the General Board of Health, kindly granted the use of tents, in which 360 of the population were accommodated. Besides these, upwards of 600 people left the locality, and dispersed themselves elsewhere. Among the people drafted into the tents not a single case of Cholera occurred, whilst 126 additional cases took place among the population which remained in the houses. There are no means of obtaining accurate information as to the 600 of the population dispersed, but it is reported generally that they experienced similar immunity. Another consequence of this great thinning of the population, amounting to the withdrawal of nearly one half of the whole inhabitants, has been that the fatality has diminished in a greater ratio among those who are left.

Tents were then (and have also again been lately) supplied by the Board of Ordnance in several other instances, at the request of the General Board of Health, with similar beneficial results, as far as has been ascertained; indeed, the valuable effects of the system seems now to be beyond question.

The General Board of Health in some of their Direc-



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tions and Regulations have ordered (with respect to *places of refuge*) that where it shall appear to the medical officer, or to a medical superintending inspector of the General Board, that such extraordinary aid is requisite, the Guardians must provide suitable rooms or places capable of accommodating necessitous cases, to which persons attacked by Cholera, and who connot be properly treated in their own homes, may be conveyed. And wherever it shall appear requisite to provide rooms or places of refuge (to which may be removed the families of necessitous persons attacked with Cholera, and also necessitous persons living with or near persons attacked, whom the medical officers may deem it necessary to remove) and to cause the houses and rooms, when persons have been so removed to the Houses of Refuge, to be cleansed and purified by the owners, or (in their default) by the Guardians.

On the occurrence of any case of Cholera, or other epidemic, endemic, or contagious disease in any room occupied by one family or more, the medical officer shall cause either the patient or so many of the occupants of such room as he shall consider would, unless removed, tend to prevent the recovery of the patient, or endanger the spreading of the disease, to be forthwith removed.

## WATER SUPPLY AND DRAINAGE WORKS—ECONOMY OF.

In adopting any lasting and really effective measures against extraordinary epidemics, such as Cholera, as well as against the ordinary (and therefore less alarming, but actually more destructive) epidemics, combined works of Water Supply and Drainage must necessarily constitute main and leading portions of such works. The results of such sanitary improvements as have already been carried out are most encouraging; yet they have been obtained for the most part from single improvements, or at least from improvements on a very limited and imperfect scale, and even those after they



have been in operation only a short time. There are towns, however, in which works are in progress that combine the several conditions of completeness, as far as such conditions are yet known; and it is found that every successive step of improvement in the construction and execution of such works, has led to increasing efficiency with diminished cost. From the experience already obtained, Local Authorities may confidently expect to be able to execute complete works of drainage and water supply, not only without increasing existing parochial burthens, but with the *positive reduction* of them. From the experience of some towns, in which the construction of combined works is approaching to completion, it appears (says the General Board of Health, in their 8th Official Circular), with reference to cottages, that the cost for *private* works of drainage and water supply is little more than one penny per week, and for *public* works another penny; and with reference to higher-class houses, that the cost for such works is little more than threepence per week. These works include the abolition of the cesspool and privy; the substitution of the water-closet, sink, and the whole of the apparatus necessary for the immediate and complete removal of refuse matter from dwelling houses; the disuse of the cistern and pump, and the consequent saving of the plumbers' and other expenses incident thereto; and, as the final result, the suppression or material diminution of typhus, scarlet fever, diarrhœa, and other most expensive diseases of this class.

## SUCCESSFUL RESULTS OF SANITARY IMPROVEMENT.

The most cheering results have been effected by Sanitary Improvement—cheering and most encouraging, as showing beyond all doubt the immense influence man may exert in diminishing the frequency and fatality of the most dreaded diseases, by the adoption of the various preventive measures which have been indicated to him by science and medicine. The follow-

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ing facts are given in support of this statement (8th Official Circular, General Board of Health), as exemplified in the experience of the Metropolitan Buildings. The result is far greater than could be anticipated or credited by any one not practically acquainted with the subject, or who had not made it a special study. If the mortality in the whole of the metropolis had, during the year 1851, been in the same proportion as in the Metropolitan Buildings, the deaths, instead of being 55,354, would have been only 29,485; that is, *twenty-five thousand lives would have been saved*. The total deaths in England and Wales for the same year were 395,933. Had the mortality been in the same proportion as in the Metropolitan Buildings, the deaths would have been only 215,073; that is, there would have been a reduction for all England and Wales of 179,860 deaths; *one hundred and seventy-nine thousand lives saved in one year!*

At the annual meeting of the Metropolitan Association for Improving the Dwellings of the Industrious Classes [July, 1853], Dr. Southwood Smith presented such very striking statistics in illustration of the experience of the Institution during the year just ended, that we cannot do better than give most of the results there mentioned by him, as a further encouragement to all sanitary reformers, and to induce them to follow out works which produced such singularly beneficial effects. These improved dwellings for the poor have been occupied between five and six years. Even during the first year, there was a decided diminution in the comparative mortality of the residents, both adults and infants; this diminution was still more marked in the second and third years; and the improvement has been steadily progressive up to the present time. Now the results so far exceed reasonable expectation as to be almost beyond belief. Yet they rest on the clearest evidence of facts.

In the Metropolitan Buildings, Old Pancras Road, for example (which contains a population of 680), the deaths during the last year have been 9, being in the proportion of 13 and a fraction out of 1000 of the living; but the



total population of the whole of the Society's establishments taken together amounts to 1343, out of which number there have been only 10 deaths, being at the rate of 7 and a fraction in 1000. The total deaths in the whole of the metropolis reached, during the same period, 22 and a fraction in 1000; so that the total mortality in London was *three times greater* in proportion than in these establishments. It appears further, that of the total population (1343) 490 are children under 10 years of age. Of these 5 have died, being an infant mortality of 10 in 1000; whereas on an average of seven years the infant mortality in the whole of London has been 52 in 1000. So that the *infant mortality* in these establishments has been *not* so much as *one-fifth* that in London generally.

A result even more remarkable now presents itself. In London the average deaths from typhus and other forms of fever amount to about 12 per cent. of the total deaths. Typhus fever is not the disease of the young, the weak, or the destitute; on the contrary, it is pre-eminently the disease of the adult, the well-nourished, and the strong. It is the destroyer of parents—not of children; and is thus one of the great causes of orphanage, and of consequent pauperism. It has its source in no want of food or clothing; in no condition natural to this climate; in no habits peculiar to the people;—one single word comprehends its main condition, *filth;* and the main source of this filth is that poison-pit, the cesspool. But the dwellings under the Association already mentioned have been provided with efficient drainage, and a good supply of water, while the cesspools have been removed; and the result is that there has *not been a single death from fever* in any one of them since they were first opened; and that a barrier has been placed around them which this mortal pest of our towns and cities has not been able to pass.

The experience of the kindred establishment over which the Earl of Shaftesbury presides is the same. Similar results have followed the working of the Common Lodging-Houses Act. That Act imposes on lodging-house keepers the necessity of maintaining

will not, we venture to predict, be able to withstand the storm of reprobation which is justly due to men who, through weakness and incapacity, have betrayed their country.

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*and the Poor Law Board.*

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certain conditions of cleanliness, forbids overcrowding, and directs the police to enforce the law. The town of Wigan may be taken as an example of the result. In this town there are 25 lodging-houses, which have received during the past year 29,655 lodgers. The superintendent of police reports:—"There has not been a single case of fever in any one of these houses since the Act has been in force." The town of Wolverhampton affords a still more striking instance. In this town there are 200 lodging-houses, which have received during the year the incredible number of 511,000 lodgers. The superintendent of police reports:—"There has not been a single case of fever in these houses since the Lodging-Houses Act has been in force in July, 1852." Similar returns have been received from other towns, as well as from the metropolis; yet before these houses were under regulation, twenty cases of fever have been received into the London Fever Hospital from single houses in the course of a few weeks.

This is surely altogether a success beyond hope and almost beyond belief. It opens a prospect of the physical and moral improvement of the people, such as before there was no warrant from experience to anticipate; and it points significantly to the means by which this great reform may be completely effected. As a general movement it may still be slow; but it must come, and then the foundation will be laid for other and higher extensions of the principle. This reform must precede all others.

## ASSISTANCE TO THE POOR.

The General Board of Health, in their eighth Official Circular, give the following recommendations on the most useful and desirable kind of aid to be rendered to the poor in the present emergency:—

"The General Board would represent that a calamity so urgent, unforeseen, and unavoidable, affords a special occasion for administering extraordinary assistance to



the poor, to enable them to keep large fires in their rooms, to protect themselves from cold and damp by warm clothing, to sustain their strength by a solid and nutritive diet, and to counteract the predisposition to disease induced under these peculiar circumstances, by suitable tonics and other remedies under medical direction. Such helps would be required in ordinary seasons under like circumstances; but they are peculiarly necessary at a time when there is a threatening of the return of the most formidable epidemic of modern times, and when the conditions in question are among the most powerful causes predisposing to the localisation and spread of the pestilence." (This was written in December, 1852, and is still more applicable at the present time.

## REPORTS OF CASES OF CHOLERA.

The Directions and Regulations of the General Board of Health order among other matters, that the Guardians shall make arrangements for obtaining daily lists of persons attacked by Cholera or other epidemic disease within their respective unions or parishes, with the particulars of their cases and treatment, and for communicating the same daily to the General Board of Health.

## PROCEEDINGS IN CASES OF DEATH BY CHOLERA, &c.

The General Board of Health in some recent Directions and Regulations ordered that, in the case of any death by Cholera, or other severe epidemic, endemic, or contagious disease, the last medical attendant upon the deceased, or other person present at the death, or in charge of the body, shall forthwith notify the death to the medical officer of the district, and the latter shall direct as may appear to him needful in respect to the care, removal, and the time of interment of the body, for preventing the communication or spread of disease.

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In the event, also, of the fatal termination of any case of Cholera, or of severe epidemic, endemic, or contagious disease, in any room occupied as a living or sleeping room by one family or more, or by numerous persons, the medical officer of the district, so soon as he shall be informed of the death, must have the corpse removed at once from the same premises, or if this be not convenient, shall remove the persons occupying such rooms until the corpse can be conveniently removed and properly interred.

## POWERS OF LOCAL AUTHORITIES.

It may be of use for persons to be acquainted with the powers possessed by Local Authorities in various places, for the prompt and effective Removal of Nuisances and Prevention of Disease.

Wherever there is a Local Board of Health under the Public Health Act, 1848, they have power to provide for—

The cleansing of streets.

The removal of filth, dung, dust, ashes, and rubbish therein.

The keeping-in-order of water-closets, privies, and drains.

The filling up or covering of places used for the collection of liquid filth.

The removal of any nuisance from pig-styes.

The white-washing and cleansing of filthy or unwholesome houses.

And, under the "Common Lodging-Houses Act," they have authority for—

The regulation of common lodging-houses.

The Directions and Regulations of the General Board of Health,* *in nowise supersede these powers;* but they direct *their active enforcement.*

* A popular abstract of the provisions of these Regulations will be found in these pages, arranged under the respective subjects of these Regulations.



Boards of Guardians are directed to see to the execution of the Regulations of the General Board of Health; but it is for the Local Board of Health to execute them. Complaints should be made to the Inspector of Nuisances to the Local Board.

Under the Directions and Regulations of the General Board of Health, the Guardians have acquired new powers of

Medical Inspection, by their Officers, of unhealthy localities.

Certifying unwholesome houses, or nuisances.

Directing what is to be done where they find epidemic disease, or the premonitory symptoms of it.

Providing, where necesssary, for house-to-house visitation.

Providing for the accommodation of necessitous cases.

Providing for the removal of the sick, or of other occupants of the same premises.

These duties, *are not within the province of the Local Boards*; but the latter, and the Guardians will co-operate in doing all that can and ought to be done under their joint powers.

Where there is no Local Board, or other such authority possessing like powers, the Board of Guardians (according to the already-named Directions and Regulations of the General Board of Health), have summary power

To cleanse streets.

To remove filth, dung, dust, ashes, and rubbish therein.

To keep in order water-closets, privies, ash-pits, and drains.

To fill up or cover places used for the collection of liquid filth.

To remove any nuisance from pig-styes, stables, cow-sheds, &c.

To white-wash and cleanse filthy or unwholesome houses.

To inspect by their Officers unhealthy localities.

To certify unwholesome houses or nuisances.

will not, we venture to predict, be able to withstand the storm of reprobation which is justly due to men who, through weakness and incapacity, have betrayed their country.

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To direct what is to be done where they find epidemic disease, or the premonitory symptoms of it.

To provide, where necessary, for house-to-house visitation.

To provide for the accomodation of necessitous cases.

To provide for the removal of the sick, or of other occupants of the same premises where the sick are.

Under the "Common Lodging-Houses Act," the Guardians have also the power of regulating common lodging-houses.

Persons in the district who have to complain of nuisances should act as follows:—

Bring the nuisance before the Guardins, who have power to examine and inquire into it, and order its removal or abatement.

There is a penalty not exceeding five pounds for disobedience.

And if the owner or ocupier of the premises where the nuisance exists is unable, from poverty or otherwise, to do what is necessary, the Guardians may remove the nuisance at the public cost.

It is most important, however, for non-official persons, and the public generally, to recollect that formidable epidemic has appeared in this country, and that the Local Authorities must have *the active aid of people of all classes* in bringing to the notice of the Boards matters requiring their attention; in avoiding ing the creation of nuisances; in removing those already existing; and in giving warning, instruction, and help, to the best of their power.

Full particulars of the powers above cited, are published by Knight & Co., 90, Fleet-street, in the form of placards for general circulation.

Reed and Pardon, Printers, Paternoster Row, London.

GENERAL BOARD OF HEALTH.

# INSTRUCTIONAL MINUTE

TO

## LOCAL AUTHORITIES

ON

## PREVENTIVE MEASURES

IN RELATION TO

# EPIDEMIC CHOLERA,

UNDER THE

## NUISANCES REMOVAL ACTS.

LONDON: CHARLES KNIGHT, 90, FLEET STREET:

*Publisher by Authority to the General Board of Health and the Poor Law Board.*

*Price Sixpence.*

GENERAL BOARD OF HEALTH

PRIVY COUNCIL MEDICAL OFFICE

NOTE.—While this minute is passing through the press, a Bill introduced by the Earl of Shaftesbury is in progress in the House of Lords for the amendment of the Nuisances Removal Acts of 1848 and 1849. This Bill repeals and re-enacts in simpler form the sections of those Acts conferring permanent powers, and gives some new and important powers of a permanent kind, especially the power of appointing inspectors of nuisances even where no Order in Council has been issued. As, however, all that is contained in the preceding Minute will continue substantially applicable, should this amending Bill become law, it has been thought desirable not to delay the issuing of the Minute till the passing of the Bill.

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## GENERAL BOARD OF HEALTH.

INSTRUCTIONAL MINUTE to LOCAL AUTHORITIES on PREVENTIVE MEASURES in relation to EPIDEMIC CHOLERA, under the NUISANCES REMOVAL ACTS.

THE General Board of Health would call the serious and immediate attention of Boards of Guardians in England and Wales, and of Parochial Boards in Scotland, to the annexed instructional minute, and to the following observations thereon.

The main object of the Board in framing the accompanying minute has been to embody in a form adapted to practical use, the results of their past experience as to the best means of meeting an outbreak of epidemic cholera. The Board conceive that the present moment is peculiarly favourable to the deliberate and efficient organization of protective measures against cholera; for whilst the imminent probability of a return of the epidemic has prepared the public mind to receive seriously any well considered plan of defence, the disease is not at the present moment so active amongst us as to warrant the suspicion that the preliminary measures which may be now arranged, will be adopted under the influence of panic, rather than of prudent foresight.

The Board, moreover, have another object to answer. Past experience has led them after much consideration, to believe that the plan of operation which it has heretofore been necessary to pursue when cholera has been epidemic in any locality, is susceptible of some improvement; and they therefore think it incumbent upon them to give timely notice of the modification they propose, and to invite the co-operation of the various local authorities throughout the country, in rendering these amended arrangements as efficient as possible for the diminution of suffering and the preservation of life.

The preventive measures recommended by the Board, as has been elsewhere explained, are based on the fact that the alarming symptoms which constitute what is emphatically termed cholera, the blue skin, the rice-water purging

the cramps, the suppression of urine, and the collapse, are almost always, if not always, preceded by what seems to be an ordinary attack of diarrhœa; frequently mild in character, almost always painless, sometimes lasting for several days, and sometimes only for a few hours. If the disease can be brought under treatment in the diarrhœal stage, recovery in the vast majority of cases is certain; but if, through ignorance, neglect or perverseness, this stage should be allowed to pass into developed cholera, little can be done by the utmost medical skill to avert a fatal termination. Any plan, therefore, which proposes to deal on a large scale with an outbreak of epidemic cholera, must provide the best possible securities that the disease shall, on its first appearance in each individual case, be immediately recognized and brought under medical treatment. It may, perhaps, at first sight appear that in order to effect the proposed object it would be sufficient to impress the foregoing plain and obvious facts upon the public, by means of placards and notices; to provide dispensaries where the poor might be supplied gratuitously with the requisite medicines, and to leave the rest to the common sense of the people. But it must be remembered that in all malarious localities, at all seasons, diarrhœa is a constant and prevalent disease, and an increase of this ever-present malady attracts no notice, or is regarded as of no consequence. It must further be borne in mind that, the principal sufferers from epidemic cholera, belong to a class whose habits of life are peculiarly calculated to render them unwilling to anticipate misfortune. They may, perhaps, be taught that the filth, intemperance, and wretchedness in the midst of which they so generally live, render them peculiarly susceptible to the worst forms of any prevalent pestilence; but unfortunately that which is the source of their danger is also the cause of their apathy. The trials which fill their thoughts are those of the day and of the hour. The pressing necessity of struggling with actual suffering begets generally a reckless indifference to merely contingent evils; and thus it has been found that even when cholera is raging in an overcrowded alley or filthy undrained court, the poor inhabitants, even when themselves labouring under the commencement of the disease (which it must be recollected is without pain), rarely apply for medical aid until the disease has reached that stage when medicine is all but unavailing.

As therefore past experience has shown that the poor cannot as a rule be induced to seek medical aid in good



time, it is of the utmost importance that medical aid should seek them. This object the Board propose to effect now as heretofore by the system of what is called house-to-house visitation.

The Board believe that the detailed exposition of this system about to be given will afford to local authorities all the information necessary to enable them, in their respective districts, themselves to carry it into efficient operation.

Before the experience of 1848 and 1849, when not only the public generally, but even the medical profession, were unacquainted with cholera in its epidemic form and when the preventive system then devised by the General Board was new in its principle, in its mode of application, and in its results, it was found indispensably necessary to engage the services of eminent medical men who had made themselves specially and thoroughly acquainted with the preventive measures in question, and to send one of these gentlemen, at the public expense, to act as a medical superintending inspector to organize and carry out the system in localities extensively attacked by the disease.

But the medical profession being now very generally informed by experience as to the peculiar characters of epidemic cholera; as to the signal failure of the mere administration of medicine to arrest its fatal progress, and the absolute necessity for this purpose of some general arrangement which may detect and stop the disease in its premonitory stages, and experience having proved the efficiency of the system recommended by the General Board for the accomplishment of this object, it appears to the Board that it is no longer necessary that local authorities should depend on extrinsic, and much less on Government aid, to enable them to put themselves in a due state of preparation to meet an outbreak of this pestilence. On the contrary, the Board is satisfied that it is in the power of local authorities throughout the country to make of their own accord, under the directions herewith sent, such precautionary arrangements as will, on the first appearance of danger, enable every pre-appointed officer to betake himself without hurry or confusion to his proper post, and with a full knowledge of what he will be expected to do.

It is true, indeed, that circumstances may occur under which local authorities may stand in need of counsel, and possibly even of the temporary assistance of a medical officer

of the Board. The Board will deem it their duty promptly to render such assistance whenever real occasion for it may arise, but it is equally the duty of local authorities resolutely to avail themselves of the means of preparation within their own power, and to place their dependence not on Government aid, but rather on their own energy, vigilance, and foresight.

Nor, should cholera prevail generally throughout the country, will it be possible for the General Board to furnish a sufficient number of medical inspectors for the emergency. In this case, the towns unassisted may complain that they have been less favoured than others, while the suffering poor must in many instances lose the benefit both of the services of the Board, and of those services which, if it had not been for the dependence placed on the Board, would have been provided by the foresight of the local authorities.

Moreover, it appears to the Board highly unjust that the cost of the additional medical and other assistance which may be needed in a locality affected by cholera should be regularly charged to the public revenue.

Not only is the rule of the public service opposed to this practice, but there are special reasons why the ordinary rule should be rigidly enforced in the class of cases under consideration. The localities which are most generally attacked by cholera, are precisely those wherein a short-sighted and niggardly thrift in rejecting the means of large and permanent economies has too often operated to deter the inhabitants from adopting the sanitary measures which would have prevented an attack altogether. It is right, therefore, that the local rates should bear the full penalty of local negligence. It is also of great consequence that those who from ignorance or motives of false economy, have been led to neglect or obstruct sanitary improvement, should be taught by personal experience that the measures which tend to promote and to preserve health, are far less costly than those which are required to combat disease.

There can be no doubt as to the power of boards of guardians to organize at once, if they choose, the necessary preventive measures. The instructions here given contain ample information as to the manner in which the preventive measures in general, and the house-to-house visitation in particular may be best conducted, and as to the machinery by which it may be most successfully worked.

If the several boards of guardians throughout the country, taking advantage of the present lull in the progress of the



epidemic should forthwith make the requisite preparation for enabling them to carry into effect, at a day's notice if necessary, the measures here recommended, every corner of the country will be furnished with a far more powerful protection against the visitation of cholera than any Government department, however vigilant and zealous, can possibly supply; whilst the sense of security which would then pervade the entire community, will strip the disease of half its terrors. On the other hand, if any Boards of Guardians should neglect the plain and obvious duties hereby imposed upon them, they must bear in mind that the responsibility of all the suffering and loss of life which may be occasioned by such neglect, will, after this notice, attach exclusively to themselves.

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## Provisions of Nuisances Removal Act.

The Nuisances Removal and Diseases Prevention Act, 1848, includes two sets of provisions; the one permanent, the other put in operation by an Order in Council issued under the 9th section.

The instructions which follow refer entirely to the latter as it is under that alone that the General Board of Health exercises any power by the Act, on the prevention or mitigation of epidemic disease. In dealing with these instructions it should be understood,—

1st. That the word "Guardians" in the following instructions, includes all official bodies having the management of the poor.

2d. That the authorities for administering the Poor Law in England, Scotland, and Ireland have the same power of enforcing the duties imposed on Guardians by the Nuisances Removal Act, as they have of enforcing the duties imposed on them by the laws relating to the relief of the poor. (*s.* 12, Nuisances Removal Act, 1848.)

3d. That for the execution of the instructions and directions of the General Board the Guardians may appoint or employ officers or persons in aid of their ordinary officers, and may defray the expenses incurred in execution of those regulations and directions, out of the funds of their unions, parishes, or respective combinations (section 14, Nuisances Removal Act, 1848), or out of the parochial funds, without any order of justices, when the cost does not exceed 20*s.*, and when it exceeds that sum, on an order of justices (or, in Scotland, of two justices, or of the sheriff or magistrates).

(*s.* 8, Nuisances Removal Act, 1849.) The Guardians may thus exercise a discretion as to charging the cost on the parish or union fund.

They should be guided in this discretion by the extent of the evil and the origin of the nuisance. If the former be general, the cost of removal may properly be thrown on the common fund. If the latter be local, it would seem (unless the relief by removal of the nuisance be general) to be right to throw the expense on the parish.

4th. That Guardians and their officers, or persons authorized by them, may enter on any premises where there is ground for believing that necessity may exist or arise for executing the directions and regulations of the General Board of Health (*s.* 13, Nuisances Removal Act, 1848.)

The Guardians of the poor, as superintendents of the execution of the directions and regulations of the General Board of Health, have to perform two classes of service. The first includes cleansing duties; the second, duties of medical precaution and relief. Both should be entered upon before the epidemic actually appears.

## Class I.—Duties in relation to Cleansing and Removing Nuisances.

### 1. *Lists of Epidemic Localities.*

Direct the Clerk to make out, or cause to be made out, from the medical officers' books or other sources of information, a list* of the places within the union, where cases of cholera, diarrhœa, typhus fever, or any epidemic or endemic disease are most commonly found.

Give the list or portions of the list relative to particular districts to the several district medical officers, and

* The books of the medical officers will necessarily afford much information, but the experience of the relieving officers in the haunts of poverty and disease will likewise enable them to indicate dangerous localities.

The records of past outbreaks of cholera, where they have been preserved, will point out the localities formerly affected, and the registry of deaths will indicate the localities which suffered most.

At Newcastle an important table has been prepared, showing the numbers of deaths from cholera in each street, &c., during the recent epidemic. There can be but few occasions which will not permit of similar tables being prepared.

Where there are dispensaries and hospitals which provide out-door attendance, the records of these institutions will likewise indicate the localities where disease ordinarily prevails.

By consulting these sources of information, or such of them as exist, the clerk, or the person specially appointed to perform his duty, will be enabled to compile a tolerably accurate list of the nests of epidemic disease.



require them to visit the places within the districts named in such list, and any other places within it, and examine the houses situate in such places where disease may be expected to appear, as to their present condition in respect to cleanliness, or as to any existing predisposing causes of disease likely to affect the inmates.

### 2. *Certificates of Places other than private Premises requiring Cleansing.*

Direct the medical officers to certify in writing to the Guardians all such places as are in a state dangerous to health, or need frequent and effectual cleansing by way of preservation against disease, and such dwelling-houses as are in a filthy and unwholesome condition, and all such nuisances and matters injurious to health as ought to be cleansed, abated, and removed, in execution of the directions of the General Board.

Direct the medical officers to certify in writing all the streets, rows, lanes, mews, courts, alleys, and passages, and public ways and places in the union, under the care of town councils, local boards of health, commissioners, trustees or surveyors, which are in a state dangerous to health, or require frequent cleansing by way of precaution against disease.—(*Certificate No.* 1.)

Direct the medical officer to certify in writing all streets, rows, lanes, mews, courts, alleys, and any passages, public ways, or places to which any houses or tenements adjoin, not intrusted by law to the care or management of any town council, local board of health, commissioners, surveyors, trustees, or others, which are in a state dangerous to health, or require such frequent cleansing.—(*Certificate No.* 2.)

### 3. *Enforcement of Cleansing under Certificates.*

Having received these certificates of the medical officers, ascertain who are the parties by law intrusted with the care and management of the streets and public places included in Certificate No. 1; send them copies of the certificate, and require them, in obedience to the 5th direction of the General Board, "to see to the effectual "and continued cleansing of all streets, rows, lanes,

" mews, courts, alleys, and passages, and public ways and " places under their respective care and management; " and to the removal of all filth, ordure, and nuisances " therefrom," under a penalty, in case of default, not exceeding 5*l.**

Warn, by printed notice, the inhabitants of the localities specified in Certificate No. 2, that every occupier of a house or tenement adjoining these localities is bound by law to keep or cause to be kept sufficiently cleansed every part of the street, row, lane, mews, courts, alley, or passage, way or place, which adjoins the house or tenement occupied by him, under a penalty, in case of default, not exceeding 5*l.*†

The medical officer having, where necessary, directed how or with what precautions the cleansing shall be done, and the nuisances removed, inform the inhabitants that it is farther required, by the directions of the General Board, that " works of cleansing, and removal of filth, ordure, and " nuisances required shall be done by effectual washing or " otherwise, and with the use of fluids or substances for " preventing the escape of noxious effluvia during the " operation, when the medical officer of the Guardians, or " others authorised to superintend the execution of these " directions and regulations shall prescribe the same."

Having thus notified to the proper parties the duties required to be done by them, proceed by yourselves or by your officers or persons already employed by you, or to be specially appointed by you for this purpose, to superintend and see to the execution of the foregoing directions and regulations in all places within your jurisdiction.

Having, in the execution of the previous duty, ascertained how far the directions of the General Board have been executed, it is your duty, in default of action by bodies or persons legally responsible, yourselves to cause the places included in both certificates to be effectually cleansed, and all nuisances to be removed therefrom.

* For the mode of recovering this penalty see Nuisances Removal Act, 1848, sec. 16.

† For the mode of recovering this penalty see Nuisances Removal Act, 1848, sec. 16.



### 4. *Proceeding for Penalty against Defaulters.*

In all cases where the default is culpable, and the parties guilty of it can be got at, proceed for a penalty not exceeding 5*l.*, under the 16th section of the Nuisances Removal and Diseases Prevention Act, 1848. (11 & 12 Vict. c. 23.)

The preceding instructions relate entirely to out-door nuisances in streets and public places.

Those which follow relate to nuisances in houses and on private premises, and should be carried out at the same time as the preceding duties, the inspector of nuisances guiding the attention of the medical officer where necessary.

As introductory to the duties which follow, it may be pointed out that, should any complaint of a nuisance under the permanent powers of the Nuisances Removal Act be preferred to any local authority having cleansing powers,* signed as required by the Act, not being a Board of Guardians, the local authority may proceed at once in its abatement, under the Act, though an Order in Council be in force, and if such a complaint be made to the guardians, they may forward the complaint to the local authority, to be proceeded with under the Act, or if there have already been default on the part of the local authority, may themselves take proceedings, under the regulations of the General Board of Health.

In this case they cannot recover expenses incurred, but may proceed for a penalty under the 16th section of the Act of 1848.

Inspectors of nuisances should be required to make periodical returns of their inspections in books prepared for this purpose, and should be furnished with all the necessary notices.†

It too commonly happens that persons are appointed inspectors of nuisances who have neither the physical nor the mental requisites for this really important office, which can hardly be filled efficiently (according to a proper conception of it) by any but a person of medical knowledge, while, for anything like satisfactory discharge of its duties, a good general education, business habits, and some prac-

* That is, a town council, improvement commissioners, or board of guardians, as the case may be.

† Which may be procured of Mr. C. Knight, 95, Fleet Street, London, publisher to the General Board.

tical knowledge of the simplest and most economical means of cleansing, deodorizing, ventilation, &c., are indispensable.

The inspector of nuisances should be thoroughly instructed by the legal adviser of the Board as to his powers and the forms of procedure.

Lime-washers should be employed to perform the work of lime-washing in a regular manner, until it is completed wherever required.

The lime-washing should be lime-washing strictly so called, and not whitewashing.

The lime should be applied as soon after burning as possible.

### 5. *Cleansing and Removal of Nuisances on private Premises.*

Direct your inspector of Nuisances to examine the houses in the district, and to make a list of all dwelling-houses in such a filthy and unwholesome state as to be a nuisance or injurious to health; and all drains, ditches, gutters, water-courses, privies, cesspools or ashpits, kept or constructed so as to be a nuisance or injurious to health; and all cases in which swine or any other animal, or any accumulation of dung, manure, offal, filth, refuse, or other matter or thing are kept so as to be a nuisance or injurious to health, and to report the cases to you.

Give notice of all nuisances so reported to the owner or occupier, or person having the care of the premises, or person causing the nuisance (according to the nature of the nuisance), and require them forthwith to cleanse, whitewash, ventilate, or otherwise purify, as the case may require, such dwelling-house, or premises, or otherwise abate or remove the nuisance or matter injurious to health; and if *they neglect to do so, do the work yourselves*, and proceed against the defaulter for a penalty under the 16th section.*

* If an owner neglects to provide a privy or drain, or the nuisance arising from the want of either is due to the owner, the notice to remove it should be made on him. But if he have provided these, and the carelessness of the occupier have caused the nuisance, the notice should be served on the occupier.



## Class II.—Duties in relation to Medical Precaution and Relief.

The Clerk of every Board of Guardians on receiving copies of the present minute, should immediately send a copy to each of the medical officers of the Board, and to each of the relieving officers. He should also without delay procure such additional copies* as may be required to furnish each member of the Board of Guardians with one copy.

The Clerk should also, after a conference with the chairman of his Board, fix an early day for submitting this minute to a meeting of the Board, and for taking into consideration the suggestions contained therein.

At such meeting the Board should direct the clerk to require each of the district medical officers of the Board to furnish, as soon as possible, the clerk, in duplicate, with a carefully prepared list of the several localities, in their respective districts, which are the usual seats of fever or other sickness in ordinary seasons, and which generally suffer most severely on the occurrence of any prevalent epidemic.

The district medical officers should also be strictly enjoined to furnish the clerk with the earliest possible intelligence of the appearance of any case of cholera, or of disease of a choleraic character, within their respective districts, or of such a general prevalence of diarrhœa as may seem to indicate an approaching outbreak of the epidemic. At the same time the other resident medical men of the town or district should be requested to do the same; as it may happen that the earliest cases may not occur to the parochial medical officer.

At this meeting, measures should be taken to ensure the services of a sufficient medical staff to carry into effect, in case of need, the system of house-to-house visitation. This staff should consist of a medical superintendent, of medical officers, one or more, and of house-to-house visitors. With reference to the house-to-house visitors it may be sufficient, as long as there is no actual outbreak, to have ascertained where these can be obtained when required; but the selection of the medical superintendent and the medical officer or officers should be proceeded with at once. Not only should the selection of the requisite number of medical men

* Any number of copies may be obtained by application in writing to Mr. C. Knight, 90, Fleet-street, at a trifling cost.

for these services, be made at the earliest possible moment, but the scale of remuneration for such services should be fixed, and means should be taken to ascertain whether the persons so selected would be ready at a day's notice, and on the proposed terms, to undertake the functions respectively assigned to them, and whether their services may be relied upon as transferable to any district or locality in which the disease may prevail.

By the timely adoption of this course, the Board of Guardians, on the appearance of epidemic cholera in any part of their district, will be enabled, without delay on the one hand, or undue precipitation on the other, to call into active service just so much of their previously constituted medical staff as may suffice to deal with the particular emergency.

QUALIFICATIONS OF OFFICERS.—1. *Medical Superintendent.*

The medical superintendent should be a man of high standing in his profession, and a man of vigour and resolution. It is desirable that he should be resident within the jurisdiction of the Board of Guardians by whom he is employed, since that circumstance may have already furnished him with several important qualifications for his work; as, for instance, an acquaintance with the localities affected; a familiarity with the habits of the resident poor; and a knowledge of the medical resources of each district.*

It may, however, happen that amongst the competent local practitioners none can be found whose private professional engagements will admit of his devoting himself entirely to the absorbing duties which, during the prevalence of an epidemic, must devolve upon the medical superintendent. In this case, the Board of Guardians must endeavour to engage the services of a non-resident medical man.

Whenever the adoption of this course becomes a matter of necessity, it is especially important that the appointment should be speedily made, in order that the person engaged may have time to prepare himself for the efficient discharge of his duty on the first summons.

If a sudden outbreak of epidemic cholera should find a Board of Guardians unprovided with the services of a

* The duties here imposed on the district medical officers have already been made matter of regulation. See Directions of the General Board of Health, dated 20th September 1853, Nos. II. and XI.



competent medical superintendent, the General Board will be prepared to recommend such an officer on receiving from the Guardians an application to that effect. Such an application may be made by telegraphic message, and it should distinctly specify the remuneration intended to be given.

The remuneration hitherto given to medical men of the qualifications required, has been 3*l.* 3*s.* per diem, travelling expenses, and 15*s.* per night for hotel expenses. It may be observed that travelling and personal expenses will of course be saved by engaging the services of a resident medical man.

2.—*Medical Officer.*

Whenever cholera becomes epidemic in any district of considerable extent, it will be found an economy of time and money, as well as conducive to the prompt and proper care of the sick, to appoint a person whose special duty it shall be to take the medical charge of the developed cases. As a general rule this should be the ordinary Union medical officer, who has to treat ordinary epidemics in ordinary seasons, and on whom therefore naturally devolves the medical treatment of the extraordinary epidemic. During the emergency, in large and populous places at least, the Union medical officer should be kept as strictly as possible to the performance of his usual duty, which is that of the care of the sick. For this reason he should have nothing to do personally with carrying into effect the visitation system, but should devote himself to the charge of the cases which the visitation discovers and sends to him. It is true that he may require assistance; and one of the first objects of the preliminary meeting should be to consider the amount of such assistance which must be given, and how it may be best supplied. The General Board would not of course venture to give Boards of Guardians any specific advice as to the *extra* remuneration which it would be right to allow the Union medical officer while performing this additional onerous duty. It may be well, however, to say that when medical men other than the parochial medical officers have been so employed, it has been usual to give them 31*s.* 6*d.* per day. If they should be brought from a distance, travelling expenses to and fro have been also allowed. In cases of pressing emergency, the General Board will promptly attend to any application which may be made to them for the services of qualified practitioners on the above terms.

### *House-to-house Visitors.*

These gentlemen are usually selected from amongst junior medical practitioners, or the more advanced students in medical schools.

The number required must be determined by considerations which will be mentioned hereafter. If there should be any medical schools, hospitals, or infirmaries in the neighbourhood of the outbreak, the requisite number of visitors will in all probability be obtained without difficulty from them. If, however, this should not be practicable, an application, by telegraph, to the General Board, stating the number required and the proposed scale of remuneration, will be immediately attended to. Visitors have usually been paid from 4*l.* 4*s.* and 5*l.* 5*s.* per week to 1*l.* 1*s.* per day. If brought from a distance they ought to be paid their travelling expenses to and fro.

### *Duties of Board of Guardians on the first intimation of the approach of Epidemic Cholera.*

As soon as the Board of Guardians have been warned, either that cases of cholera have occurred, that cholera has broken out as an epidemic in any part of their district, or that the unusual prevalence of diarrhœa renders such an outbreak *imminent*, the medical superintendent should be summoned to his post and should immediately obey the summons.

### *Preliminary Meeting of Medical Men.*

On his arrival, the first step of the medical superintendent should be to call a meeting of the district medical officers and the medical practitioners of the neighbourhood. He should then explain that the object of the proposed arrangements is to furnish the poorer classes, who are likely to be the greatest sufferers from the epidemic, with such medical aid as private practitioners may be unable to supply; and that this object would, to a great extent, be frustrated if those arrangements were allowed in any way to interfere with the practice of private practitioners. It is most essential to insist on this point, and it would be well to engage that any interference with private practice on the part of any officer employed, would be followed by immediate dismissal.

The medical superintendent and medical officers should then consider and settle their combined plan of operations; the medical districts which should be included within



these operations; the number of house-to-house visitors required for the special districts likely to be attacked, and for the several services; the propriety of establishing temporary hospitals for the reception and treatment of the sick; the best sites for such hospitals, for houses of refuge, and for dispensaries; the medicines with which sufferers from diarrhœa should be supplied in the intervals which may elapse before the arrival of medical aid; the notices and placards which it would be desirable to circulate for the information of the people; the forms in which the statistical returns of the daily progress of the disease should be made, and the times at which the medical superintendent, district officers, and visitors should meet.

A few suggestions on each of these points may be of use.

### *Districts.*

The term "districts" is here used to denote the areas assigned to a given number of medical officers. The existing division of the parish or union into districts for ordinary medical relief should, as far as possible, be retained; and the districts and sub-districts included in the plan of operations should be such of the existing medical districts as may be either affected or threatened with cholera.

### *House-to-house Visitors.*

The number of house-to-house visitors required in the various districts will, of course, depend on the number and extent of the epidemic localities, and on the extent to which the disease may actually prevail. The district medical officers and the resident medical practitioners ought to prepare themselves before coming to the meeting with the means of advising on this point.

### *Hospitals.*

The General Board have rather discouraged the multiplication of hospitals for the reception of cholera cases. Experience has shown that whenever a person is struck with premonitory diarrhœa or cholera, it is particularly desirable to keep the patient warm and strictly quiet, in bed, if possible, and to apply the proper remedies on the spot. Numerous cases have occurred where the exhaustion, consequent on the removal of a patient in the early stages of the disease, has brought on, or greatly accelerated, a fatal collapse. It will, however, be right to appoint some hospital accommodation for those who may be taken ill in the streets, or at a distance from home, or who live in crowded and

unhealthy rooms, in which the proper remedies for the disease cannot be applied. The hospitals should be well ventilated, and well drained, and should be near the epidemic locality without being in it. Care should be taken to avoid any sites that may be near accumulations of refuse or marsh land or the banks of foul streams. Whenever there is a general hospital in the town, conveniently accessible arrangements should, if possible, be made with the authorities for the reception of necessitous cases.

*Houses of Refuge.*

Experience has abundantly proved that when cholera has broken out in a foul and noisome locality, or in an overcrowded, ill-ventilated, and dirty house, the best means of preventing the spread of the disease, and the consequent loss of life, is to remove the inhabitants until the necessary cleansing, and other remedial measures have been executed. For this purpose some temporary places of accommodation should be provided for the people.

These places may be either hired houses, or other spacious buildings, warehouses properly fitted up, or temporary erections, as large sheds, made for the purpose. Sometimes tents, or school-rooms, unoccupied chapels, &c., have been used with advantage, and sometimes vacant rooms in the workhouse. In all cases the advantage of removing persons at once from the immediate influence of the causes of infection has been so conspicuous as to render the provision of houses of refuge one of the most important means of counteracting the spread of cholera. Great care should also be taken to select only such sites for houses of refuge as are dry, elevated, and capable of free ventilation. These places should always be in readiness in case a sudden outbreak of the disease should occur.

*Dispensaries.*

In every affected district dispensaries and depôts for medicine should be established, where, at any hour of the day and night, the poor may be able to obtain, gratuitously, medical advice and a supply of appropriate medicines.

The dispensaries should be the surgeries of the Poor Law medical officers, and, if deemed necessary, special depôts should be temporarily appointed.

In many instances the chemists' shops will be found to be the most convenient places.

In rural districts, depôts of ready prepared medicines should be made at the houses of one or more of the most intelligent and influential residents.



*Medicines.*

The medical superintendent and medical officers will have to consider the medicines which, before the arrival of qualified medical practitioners, may, in cases of urgency, be administered, either by the visitors or the dispensers, to persons suffering from premonitory diarrhœa. It is not within the province of the General Board to make any recommendation as to the treatment of cholera; but it may be useful to state what the College of Physicians have published for general information on the subject.

The College say:

"1. No degree of looseness of the bowels should be neglected for a single hour. Medical advice should be at once sought when the looseness begins; and previous to the arrival of a medical attendant, some of the medicines at other times used for checking diarrhœa should be taken; for example, the chalk mixture, the compound cinnamon powder; or the compound chalk powder, with opium; in doses of from 20 to 40 grains for an adult.

"2. No saline aperients or drastic purgatives should be taken without the advice of a medical man.

"3. Intemperance in eating or drinking is highly dangerous; but the moderate use of vegetable as well as animal food may be recommended, and in general such a plan of diet as each individual has found, by experience, to be most conducive to his health; for any considerable change in the diet to which a person has been accustomed is seldom advisable during the prevalence of an epidemic.

"4. Debility, exhaustion, and exposure to damp, render the poor especially subject to the violence of the disease. The committee urge upon the rich the necessity of supplying those in need with food, fuel, and clothing.

"5. The extreme importance of removing or counteracting all impurities, whether in the air, water, or soil, as by ventilation, cleanliness, and the free use of the chloride of lime or chloride of zinc, cannot be too strongly insisted upon.

"Lastly. Since the reports made to the College of Physicians show that of the persons who were engaged about the sick in the last epidemic, the number of those who were attacked by the disease was, in proportion, exceedingly small, the fear of infection may be practically disregarded."

*Notices and Placards.*

These will be required for the purpose of thoroughly informing the people what they should do, and what has been provided for them. A form of notice embodying the various points to which the attention of the people should be strongly drawn, is appended. (See Appendix A.) Mr. C. Knight has also published a notice, headed "Plain "Advice to all during the Visitation of the Cholera." It will be found a very useful adjunct to other similar notices. The copyright of the "Advice" is Mr. Knight's property; it may be purchased at the rate of 3s. per hundred.

*Returns.*

In order to enable the local authorities to ascertain the state and progress of the epidemic from day to day, it is particularly desirable that returns of the cases discovered and treated, as well as of the deaths, should be daily made. These returns will also be of great national importance, as tending to improve our acquaintance with the disease, and to suggest the most efficacious means of dealing with it on a large scale. The proposed returns will come under four heads—"Visitors' Returns," "Dispensary Returns," "Dis-"trict Medical Officer's Returns," and "Returns by Medical "Superintendent."

Forms for each of these returns are given in Appendix B, together with short instructions for filling them up.

These returns will, on the whole, be more practically useful, if confined to those cases which fall within the range of the house-to-house visitation system. If more is attempted less will be effected. The main objects are to ascertain the exact daily progress of the epidemic among the poorer classes in every district; to determine clearly the proportion which exists between cases of diarrhœa and cholera; and the precise effect of early treatment. Inasmuch as it would be impossible to obtain exact and regular accounts of the various cases of diarrhœa and cholera which come under the notice of private practitioners, the entry in the returns of such incidental cases of cholera or deaths as might be reported by individuals would only tend to impair the certainty of the inferences deducible from the returns. Thus, if private practitioners were to report the deaths which occurred in their practice, and not the cases of diarrhœa, the entry of the deaths so reported in the returns, would make the proportion of deaths to cases



of diarrhœa appear larger than the truth would warrant; whereas, by confining the returns as suggested, they will not only constitute unexceptionable evidence of the conclusions deducible from them, but they will serve as a basis for establishing very fair inferences as to the class of cases which cannot be fully observed.

The returns of deaths throughout the union from cholera or diarrhœa ought to be furnished daily to the medical superintendent by the local registrars. The returns should be made up invariably from midnight to midnight.

*Times of Meeting.*

It is of importance that the medical superintendent and the medical officers should meet once every day at some appointed hour; or at all events as often as may be requisite. The evening has been usually found to be the most convenient time. At this meeting measures may be concerted for remedying defects in the plan of operations, or for increasing, diminishing, or re-distributing the staff of medical assistants and visitors, so as to meet the exigencies which may at the moment be most pressing.

*Special Duties of the Medical Superintendent.*

He is to organize, regulate, and take the entire conduct of the visitation system immediately after the preliminary meeting already described. As the first step in the fulfilment of this duty, he should communicate to the clerk of the Board of Guardians the probable number of qualified medical assistants, and of medical students that will be necessary to form the visiting staff; and should take the necessary means to engage this number, and to ensure their being in readiness to obey his summons the moment he issues it.* He should also inform the clerk of the guardians of the nature and extent of the accommodation needed for the temporary hospitals and houses of refuge; the districts which will be placed under inspection; and the dispensaries or depôts of medicine which it may be proposed to open.*

His next step should be to divide the locality under his charge into districts and sub-districts for visitation purposes. As the daily visitation will be carried on only in the localities which are the usual haunts of epidemic disease, and the dwelling places of the poorer classes, care should be taken that the limits of each sub-district should be considered with reference

* If the clerk has not previously received from the guardians the requisite authority to make such arrangements as the medical officer may think necessary, he should at once apply for such authority, and lose no time in acting upon it when obtained.

to this basis of action. As a general rule each sub-district should embrace only so many houses as one visitor can manage effectively to visit every day. The number of such houses will of course vary with circumstances; but in thickly peopled localities, where the several stories and apartments of each house are generally inhabited as distinct tenements by different families, it has been found that one visitor may (at first) efficiently visit every day 200 separate families. After the system has been at work some days, a considerably greater number can be visited, because the people then understand the nature of the preventive service which is applied for their welfare, and are prepared with a speedy answer to the questions which they know will be put to them.

The next care of the medical superintendent should be to provide temporary hospitals, houses of refuge, and dispensaries, and to place them respectively in the best state practicable, as regards their sanitary arrangements and general efficiency.

In places where there are factories he should write to the Secretary of State for the Home Department, requesting him to authorize the factory inspectors to direct their certifying surgeons to visit such factories daily, for the purpose of inquiring as to the existence of diarrhœa amongst the work-people, and promptly administering the proper medicines.

He should also address a circular to the proprietors or managers of every establishment where large numbers of work-people or children may be daily congregated together, inviting them to co-operate with the medical officer, and suggesting the means by which such co-operation might be made most effectual. A form for the proposed circular, together with a form of the return which the persons addressed are requested in the circular to transmit to the superintendent, are annexed (Appendix C. 1 and 2).

The medical superintendent, on receiving any such return, will immediately see that the cases reported therein are at once brought under medical care.

After settling with his colleagues the remedies, which in cases of emergency may be administered to persons suffering from diarrhœa, during the interval which must often elapse before the arrival of a qualified practitioner, the medical superintendent will take care that directions for the use of each form of medicine be printed in plain type, and that instructions be given to all persons charged with the distribution of the medicines, whether at the dispensaries or



elsewhere, to attach the appropriate directions in the form of a label, to such medicines.

The directions should never omit to state briefly the dose for adults, for young persons, and for children.

The medical superintendent will urge the strict observance, as far as possible, of the regulations issued by the General Board, under the Nuisances Removal and Diseases Prevention Act, more especially as to the removal of nuisances, the cleansing and whitewashing of filthy tenements, the ventilation of unwholesome rooms, the prevention of over-crowding, and the enforcement of the Common Lodging-houses Act.

He should every day send to the General Board the returns (duly filled up), of which forms are given, (Appendix B 4 and 5), accompanied by such remarks as he may deem calculated to display any interesting points connected with the progress of the disease. Any important information relative to outbreaks in neighbouring localities, though not in his district, should be promptly forwarded by him to the General Board. It is of the utmost importance that these returns are made regularly day by day. During the height of an epidemic it will require some exertion to accomplish this, but the only security for the work being properly done is that the returns are duly made every day.

He should every day, or as often as necessary, meet the medical officers, assistants, and visitors, at the appointed hour; receive their several reports, and settle (with their advice) any practical questions of administrative detail, which may have been raised by the proceedings of the day; and also confer with them as to the expediency of increasing, diminishing, or re-distributing the staff of medical assistants and visitors.

When the epidemic is over, he should prepare for transmission to the General Board, a succinct report on the whole history and progress of the epidemic, from its first commencement to its termination, accompanied with full statistical tables and a map, marking the infected localities. The points to which the report should be chiefly devoted are suggested in the list of queries set forth in Appendix D 1 and 2, and in the statistical tables in Appendix E 1, 2, 3, 4, 5, and 6.

### *Duties of Medical Officer.*

The first duty of the medical officer is to give instant attention to the treatment of the sick. He should therefore, immediately visit all cases of cholera reported to him by the visitors, or which may otherwise come to his knowledge as

being destitute of medical aid. He should also give prompt attention to every case of premonitory diarrhœa which the visitors may report as requiring his assistance.

He will further execute, with all practicable efficiency, the various duties assigned to the district medical officers in the directions and regulations issued by the General Board, under the Nuisances Removal and Diseases Prevention Act, especially those which relate to overcrowded dwellings and the removal of nuisances.

He should supervise such cleansing operations as might be attended with risk if negligently performed.

His surgery should be open all day as a dispensary (see below as to duties of persons in charge of dispensaries). If his house should be one of those deemed convenient for the purpose, he should have his surgery open as a dispensary all night, for the use of one of the legally qualified medical men who might be appointed to assist him.

He should see that a supply of blankets, sand, salt, fuel, &c., is kept at a convenient place in each district; but no such articles are to be given out except upon his written order or that of the medical superintendent, countersigned by some person authorized in that behalf by the Board of Guardians.

He should endeavour to organize a staff of nurses for the care of such poor and destitute persons, as most urgently require constant attendance.*

He should, in proper cases, furnish persons with tickets of admission into houses of refuge, and no persons should be admitted into such houses without a ticket signed by him, or one of his qualified assistants.

He should give such directions as may appear to him to be needful, with respect to the care, removal, and the time of interment of the bodies of persons dying of cholera.

He should, unless where other arrangements have been made, furnish the house-to-house visitors with a supply of medicines for administration on the spot to all persons suffering with premonitory symptoms, and with a sufficient number of printed labels of directions adapted to each kind of medicine.

He should meet daily the medical superintendent and the medical assistants, punctually at the hour appointed for the meeting. He should daily have in readiness by 10 a.m., the return for the previous day (Appendix B 3). He

* The provision of blankets, &c., and of a staff of nurses will, of course, be made after communication with the clerk of the Board of Guardians and the medical superintendent.



will, to the best of his ability, furnish full replies, when required to do so, to the queries contained in Appendix D 2. He should also be in daily communication with the house-to-house visitors of his district.

### *Duties of House-to-House Visitors.*

The house-to-house visitor will be directed in his operations, in all respects, by the medical superintendent.

He will take notes of the cases discovered by him according to the schedule entitled "Visitor's Return" (Appendix, B 1), and will make a daily return to the medical superintendent.

He will visit every house in the sub-district assigned to him, once each day, *at the least*, commencing his visitation at as early an hour in the morning as circumstances will permit. In cases of sudden outbreaks of the epidemic in confined localities, it may be necessary that the visitation should be made more frequently, and in the morning, early.

He will hold himself in readiness to take charge immediately of any new sub-district that may be assigned to him by the medical superintendent, whether within or without the district in which he may have previously served.

He will use his best endeavours to discover the existence of cholera and diarrhœa in the sub-district assigned to him. He will by his manner and behaviour endeavour to gain the confidence of the people among whom he visits. He will be provided with medicines to administer on the spot to all persons found to be suffering from diarrhœa or other premonitory sickness, or from symptoms approaching cholera.*

Whenever he finds a case of diarrhœa which resists simple treatment, and especially if it be attended with any one symptom of approaching cholera, &c., he will immediately report it as a case of urgency to the medical officer.

Whenever he finds a case of cholera or collapse, he will instantly despatch a messenger to the medical officer informing him of the fact.

He will not interfere in the subsequent management of such cases, except under the direction of the medical officer, and he will be most careful not to interfere with cases already under medical treatment, unless in *emergency*.

He should in a kind manner converse with the people, allay alarm by explaining to them that the fear of infection

* These medicines will be most conveniently carried in a small tin box, as at Glasgow and Dundee.

from cholera may be practically disregarded; that the disease is not ordinarily so sudden and destructive as it appears, but that it begins by a milder stage, consisting of looseness of the bowels, which is in the majority of cases easily curable: he will give advice as to the importance of cleanliness of person and dwelling; of ventilation, more especially of their sleeping-rooms; temperance, and proper diet.

He should strongly impress on the people the great danger of neglecting looseness of the bowels *or diarrhœa*, and the necessity of immediate application, on the first appearance of these symptoms, to the dispensaries or depôts; and in urgent cases, to the medical officer in charge of the district, at any hour of the day or night.

He should especially caution the people not to wait, if taken ill with these symptoms, till the visitor comes round, but to apply at the proper dispensary or depôt at once. He should also caution the people not to move about while diarrhœa is upon them, but to remain quiet, and, if possible, in bed; many persons having lost their lives by neglecting perfect quietude in the horizontal posture in the early stage of cholera.

He will himself distribute, or superintend the distribution of, handbills* giving information and instruction as to the arrangements which have been instituted.

He will state in his return to the medical superintendent, or to the parties in charge of the blankets, &c., the names of such necessitous persons as he may think should be supplied with such articles.

He will warn persons living in unwholesome dwellings, and in infected districts, of the urgency of cleansing operations, and of temporary removal from such localities, and he will endeavour to induce parties to act upon his advice.

He will report to the superintendent, or to the proper authority, all nuisances which he may discover during his visits; and any houses, rooms, or localities, which may stand in urgent need of cleansing and purification, according to the form annexed, Appendix B 6.

He will meet the superintendent every day at the time appointed. He will, to the best of his ability, furnish full replies, when required so to do, to the queries contained in form annexed (Appendix D 1).

* These handbills should be similar to the notice, Appendix A.



### *Duties of Persons in Charge of Dispensaries and Depôts for Medicines.*

The medical officer will, of course, superintend the arrangements for the dispensing of medicines at his own surgery.

The persons charged with the management of temporary depôts should always, when practicable, be qualified medical practitioners. They will be subject to the direction of the medical superintendent.

At each of the dispensaries, both those which are opened by day, and those which are opened by night, some *qualified* assistant should be always on the spot ready to give medical advice and medicines to all applicants.

The medicines prescribed for administration as remedies for premonitory symptoms should be kept ready made up, and, as has been already pointed out, should never be given to an applicant without an appropriate printed label of directions. The advantage of this arrangement will be that persons requiring any supply of medicine, in addition to that kept by the visitor, may obtain the same by a direction simply in this form:—

Pills No. 2.
Mixture No. 1. &c.

Dispensers must accurately fill up the returns containe in the form annexed (Appendix B 2.), and transmit them to the medical superintendent. These returns must also be filled up by the person in charge of the dispensary, even when he happens to be the medical officer.

In the foregoing minute the Board have not insisted in detail on the importance of the most rigid enforcement of the directions issued by the Board under the Nuisances Removal and Diseases Prevention Act, partly because they presume that Boards of Guardians are already fully alive to the duties imposed on them by Parliament in relation to those directions, and partly because they are unwilling to complicate the exposition of the process by which the system of house-to-house visitation may be most effectually worked with any collateral details.

# APPENDICES.

## APPENDIX A.

*Form of Notice to inhabitants of arrangements adopted to meet epidemic cholera.*

NOTICE.

The Board of Guardians hereby inform the inhabitants that the following arrangements have been made by the authorities for the relief of the poor, and for the preservation of the public health during the persistence of Epidemic Cholera:—

MEDICAL ADVICE AND ASSISTANCE.

The town has been divided into districts, which are the same as the parochial medical officers' districts. Applications for medical advice, attendance, and medicines for cases of cholera (which may be had *without charge*) may be had in—

*District* No. 1, *District*—to Dr.
" " *or* " Dr.
*District* No. 2, *District*—to Dr.
" " *or* " Dr.
*District* No. 3, *District*—to Dr.
" " *or* " Dr.

*All of whom are empowered and required to afford assistance with the least delay possible.*

DISPENSARIES AND DEPÔTS FOR THE SUPPLY OF MEDICINES.

It has been found that cholera is preceded by looseness of the bowels for some time, sometimes days, sometimes only hours, before the severer symptoms of cholera set in; such as sickness, vomiting, cramps, or severe purging. In this stage the disease is easily curable, but if it be neglected the disease may rapidly run on to its more dangerous form, when its course can scarcely be controlled, and death generally ensues.

Persons suffering from looseness of the bowels should apply, even although there be no pain of the bowels, at any of the following places, where medicines, with printed instructions, may be obtained. Persons affected in the night are urgently warned not to wait till morning, but to apply for medicines (or attendance, as above directed, if necessary) at once, at

THE DURING THE NIGHT.

Where the medical officers will be in attendance.

In addition to the above, medicines will be supplied *gratuitously*

DURING THE DAY by—

HOUSE-TO-HOUSE VISITORS.

Qualified persons will be appointed by the authorities to visit the infected localities, and to distribute medicines to those



among the people who are affected with cholera, or looseness of the bowels.

Persons affected with looseness of the bowels are not, however, if they become worse during the period intervening between the visits of the house-to-house visitor, to wait till his return, but to apply to the local dispensary or depôt at once.

NURSES.

The district medical officers and assistant officers are empowered to employ certain nurses for the care of those *poor and destitute persons* who more urgently require such aid. Persons willing to become nurses will send in their names to the undersigned.

HOSPITAL ACCOMMODATION.

Cases of cholera occurring among the poor and destitute will be received into the on the order of the medical officers of the and of the above district medical officers; but the public is earnestly cautioned against sending cases of *complete collapse* to the , because the patient will, in consequence of removal, only die the sooner.

HOUSE OF RECEPTION.

A house of reception has been provided at for the reception of the families of those persons suffering under cholera whose houses are in such a state as to endanger the lives of the occupants, or where temporary cleansing works are necessary for safety. All persons are urgently warned that the only true measure of safety for those who inhabit unwholesome dwellings and infected districts is removal from the locality.

HOUSES UNWHOLESOME AND UNFIT FOR HUMAN HABITATION.

Inspections are being made, and the owners of all such houses or parts of houses will be proceeded against. To avoid proceedings, owners of such houses should at once endeavour to place them in a wholesome condition.

LODGING HOUSES.

All persons keeping lodging houses are required to register the same forthwith, in accordance with the law. Persons keeping lodgers without being registered and properly licensed, incur a penalty of £5.

INSPECTION OF NUISANCES.

Inspections of nuisances are being carried on. All complaints should be delivered in writing at the , addressed to Mr. , when the most prompt attention will be paid, and the necessary steps taken for their removal, where practicable.

By order of the Board,

, Clerk of the Board of Guardians, or
Inspector of Poor.

## APPENDIX B 1.

TOWN OF _____

VISITOR'S RETURN.

*Daily Return of Cases of Choleraic Disease descovered on Visitation.*

*District*, _____ *Sub-District*, _____ *Date*, _____ 18

| No. of Case. | Name. | Occupation. | Age & Sex. M. | Age & Sex. F. | No. of Inhabitants in tenement. | No. of House. | Name of Street, Lane, or Locality. | New Cases discovered. Diarrhœa. | Cholera. | Collapse. | Consec. Fever. | Corpses. | Old Cases passed from D. to Ch. | Old Cases passed from Ch. to Col. | Remarks as to Sanitary state of Locality or Cause of Death. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | |

Total Cases discovered, _____

No. of Tenements or Families Visited, _____ Signature of Visitor, _____

The Cases are to be numbered consecutively from first to last.



## APPENDIX B 2.

TOWN OF _____

DISPENSARY RETURN.

*Dispensary Return of Daily Applicants for Medicine for Choleraic Disease.*

*District* *Date*, _____ 18

| NAME. | Sex. M. | Sex. F. | Occupation. | Place of Residence. | First Stage. Diarrhœa. | Second Stage. Cholera. |
|---|---|---|---|---|---|---|
| | | | | | | |

Total Applications, { First Stage / Second Stage } Signature of Party in Charge of Dispensary, _____

## APPENDIX B 3.

TOWN OF

MEDICAL OFFICER'S RETURN.

*Daily Return of New Cases of Choleraic Disease attended.*

District, No. _____ FROM MIDNIGHT TO MIDNIGHT. Date, _____ 18 .

| No. of Case. | Name. | Age. | Sex. | | Occupation. | Residence. | Diarrhœa, Cholera, Collapse. | | | Old Cases passed from | | Deaths. | Remarks as to Sanitary Condition of Locality. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Male. | Female. | | | Diarrhœa. | Cholera. | Collapse. | Diarrhœa to Cholera. | Cholera to Collapse. | | |
| | | | | | | | | | | | | | |

N.B.—Enter Cases consecutively from beginning—the date is to be that of actual attendance on Cases. When Deaths are recorded, it will suffice to refer to the number on List when first reported.

Signature of District Medical Officer.

*Medical Officer's Return.*

## APPENDIX B 4.

TOWN OF

MEDICAL SUPERINTENDENT'S RETURN.

*Summary of Cases of Choleraic Disease attended to, relieved, and discovered.*

*Date* 18

| District. | Cases Reported by District Officers. | Diarrhœa. | Cholera. | Collapse. | Deaths. | | District. | Dispensary Cases, i.e. Cases seen at the Surgeries of the Medical Officers, or Relieved at Depôts. | Diarrhœa. | Cholera. | Collapse. | Deaths. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Cholera. | Diarrhœa. | | | | | | Cholera. | Diarrhœa. |
| 1. | Mr. | | | | | | 1 | Mr. | | | | | |
| 2. | Mr. | | | | | | 2 | Mr. | | | | | |
| 3. | Mr. | | | | | | 3 | Mr. | | | | | |
| 4. | Mr. | | | | | | 4 | Mr. | | | | | |
| | | | | | | | | Total - - - | | | | | |
| | | | | | | | | Cases discovered by Visitors. | | | | | |
| | In Workhouse, Hospital. | | | | | | 1 | 1 | | | | | |
| | | | | | | | 2 | 2 | | | | | |
| | | | | | | | 3 | 3 | | | | | |
| | | | | | | | 4 | 4 | | | | | |
| | | | | | | | | Total - - | | | | | |
| | Total - - - | | | | | | | Grand Total - | | | | | |

Signature of Medical Superintendent _____

*Medical Superintendent's Return.*

## APPENDIX B 5.

TOWN OF_____

MEDICAL SUPERINTENDENT'S RETURN OF VISITOR'S SUMMARY.

*Summary of Cases of Choleraic Disease discovered on House Visitation.*

Date_____ 18__

DISTRICT No. 1.

| | Diarrhœa. | Cholera. | Collapse. | Corpses. | Total New Cases Discovered. | Old Cases passed from | |
|---|---|---|---|---|---|---|---|
| | | | | | | Diarrhœa to Cholera | Cholera to Collapse. |
| New Cases since Yesterday - - | | | | | | | |
| Since Commencement of Visitation | | | | | | | |
| Total - - - - | | | | | | | |

DISTRICT No. 2.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| New Cases since Yesterday - - | | | | | | | |
| Since Commencement of Visitation | | | | | | | |
| Total - - - - | | | | | | | |

Signature of Medical Superintendent_____





## APPENDIX B 6.

TOWN OF _____.

NUISANCE RETURN, TO BE FILLED UP BY MEDICAL OFFICERS AND VISITORS,

*Of Houses and Localities which require Cleansing Operations in the Town of*_____

District _____. Date _____ 18__.

| Localities. | Name of Occupant. | Pigs, &c., to be removed. | Houses, Stores, Shops, Buildings, Stalls, Yards, or Enclosures to be cleansed. | Ponds, Pools, open Ditches, Sewers, Drains to be cleansed, covered, or filled up. | Privy, or Cesspool to be emptied or cleansed. | Dust, Ashes, Filth, Manure, Dung, Soil, or decaying or offensive Animal or Vegetable Matter to be removed. | External Lime-washing of whole or part of House or Yard or Enclosure. | Internal Lime-washing of whole or part of House. | Houses or Parts of Houses unfit for Human Habitation. | Other Cleansing Operations. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | |

Signature of Medical Officer or Visitor_____

## APPENDIX C 1.

*Form of Notice to owners, managers, and overseers of public works and establishments.*

SIR,

I AM directed by the Guardians of the Poor of to call your attention to the accompanying notice, which they have deemed it their duty to issue to owners, managers, and overseers of public works and establishments, and others who employ or have under their care, large numbers of persons.

I am, &c.

Clerk to the Board of Guardians.

## NOTICE.

Experience has fully shown that during the prevalence of epidemic cholera, owners, managers and overseers of public works and establishments have it in their power, by proper precautions, to effect a great saving of life among their work-people.

It is of great importance to bear in mind that the workers i large establishments usually leave home before the time at which the house-to-house visitation can be systematically commenced, and are therefore deprived of the benefits of this most important measure of prevention.

In all places where numbers of people daily assemble at work, the first care of persons in charge of the work-people should be to make an arrangement by which an inquiry may be daily made as to the existence of looseness of the bowels among any individuals in the establishment. For this purpose, one trustworthy person in each story or room should be selected, who should be duly instructed in this duty.

This inquiry ought to extend over the whole period of the epidemic influence, and should be made in the morning, when the work-people first assemble; seeing that persons affected with choleraic disease frequently leave their own homes for work, in the dangerous, and often false, belief that the disease will "*work itself off.*"

The great importance of paying attention to the very first signs of choleraic disease ought to be impressed upon the people, also the advisability of promptly seeking medicines and medical aid; and this caution should be impressed as applying alike to their being attacked in the establishment, warehouse, or factory, as at their own homes.

The majority of cases of cholera which prove fatal, terminate in twenty-four hours; the period for the application of preventive



treatment is therefore so short, that the loss of an hour may be the loss of life.

The arrangements for the prevention and mitigation of the disease ought to be made thoroughly known, and for that purpose the hand-bills and placards of the authorities should be posted up in some conspicuous place in each story or room in the establishments and factories.

At all the establishments a supply of the medicines, with the printed instructions, adopted by the parochial medical officers, should be kept, and be readily accessible to the members of the establishments, and to the work-people.

Where establishments are superintended by their own medical officers, upon such officers should be devolved the duties of seeing that the instructions are carried out, and that proper medicines are supplied to the work-people; but in no cases should the duty of daily inquiry, and the providing of remedies on the spot be neglected. Where no medical officers are in charge of such establishments, special medical officers should be appointed.

A record of the persons that apply for medicine, should be kept, in order that the attention of the medical officer may be promptly called to all such cases.

The same instructions as above apply with peculiar force to all assemblies of children at schools, and, in fact, to all persons who have the care, management, or superintendence of numbers of persons.

The principle holds equally true with regard to all domestic establishments. Thus the heads of families should make similar inquiries.

It is highly encouraging to be able to state, that these measures of precaution, resolutely and perseveringly carried out, have been found signally successful, in preventing the premonitory or first and easily curable stage from passing to the more fully developed and highly dangerous stages of the disease.

APPENDIX C 2.

TOWNSHIP OF _____

FACTORY OR PUBLIC ESTABLISHMENT, OR WORKS RETURN.

Name of Factory, _____ Date _____ 18

*This Return to be prepared and in readiness every morning by 10 o'Clock.*

The object of this Return is to ascertain carefully—as far as practicable—the parties who have become ill, and who stand in need of prompt medical aid, in order that such aid may, as far as possible, be secured to them.

The Return, after being prepared, should be forwarded so as to reach the appointed place by 11 A.M. at latest, at which time a Visitor will call at the place for the Return, and will have passed to such parties as are referred to as really suffering from Cholera or disease, and are unattended to. Those who are unattended to will receive medicine from the Visitor, and be placed in communication with the Medical Officer of the district in which they reside.

| Persons taken ill during previous Twenty-four hours with Cholera or disease, and who have gone home in consequence of such illness. | | | | Persons absent during previous Twenty-four hours, the cause of whose absence is presumed to be Cholera or disease. | | | |
|---|---|---|---|---|---|---|---|
| Name. | Address. | Result of Inquiry. | Result of Case. | Name. | Address. | Result of Inquiry. | Result of Case. |
| | | | | | | | |



APPENDIX D 1.

GENERAL BOARD OF HEALTH.

QUERIES.

Addressed to Mr. _____ Medical Visitor in the Town, Parish, or Union of _____

1. How long were you employed as Medical Visitor?
2. In what (Registration) District were you employed?
3. What was the total number of cases discovered by you of
   Diarrhœa?
   Cholera?
   Collapse?
   Corpses?
4. Can you form any opinion of the number of cases of Diarrhœa discovered and treated by you, which, but for prompt treatment, would have passed into developed Cholera?
5. What, according to your experience, is the number of separate families which may on an average be properly visited in a day, in your particular district?
6. Will you specify any particular sanitary evils in your district which the House-to-house Visitors have brought to light?
7. In the course of your visitation, have you discovered any place the sanitary arrangements of which were tolerably perfect, yet where, nevertheless, Cholera prevailed?
8. Has there been any, and what is the amount of, improvement in the sanitary condition of the district visited by you, effected since the outbreak of the epidemic?
9. Have the nuisances which you reported been abated, and to what extent? Have the poor com-

plained much of nuisances, and of their inability—from want of efficient paving, draining, and scavenging—to remedy their condition?

10. State, *in extenso*, the causes which have operated to prevent the discovery of actually existing diarrhœal attacks in your district?

11. Were the chief causes of the localization of the disease in your opinion irremovable, that is, arising from unimprovable structural arrangements of property?

12. Will you state the local and removable causes in the district visited by you which have contributed to the localization and spread of the disease?

13. Has overcrowding prevailed, and to what extent?

14. Were the necessities of those attacked with choleraic disease sufficiently and promptly attended to, when brought to the notice of the local authories?

15. What remedies did you find most efficacious in stopping the premonitory Diarrhœa?

16. Have you, during or toward the termination of the epidemic, observed any merging of Cholerine into fever without the disease passing into fully developed Cholera?

The Visitor is particularly requested to take notes during his Visitation, so as at its termination to be able to give an account of the sanitary condition of his district, as far as practicable under the heads of:—

Location and structure of houses?



Space allotted to dwelling-houses?
House accommodation; that is, as to dust bins, cupboards, coal-receptacles, sinks, fire-places?
Lodging-houses?
House cleansing by drainage?
————by removal of refuse?
Scavenging?
Privies and cesspools?
Paving?
Street Cleansing?
Nuisances?
Water Supply?
Ordinary Sickness, Disease, and Mortality?

(*Signed*)
(*Stating qualifications.*) Medical Visitor.
(*Date.*)

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*Note.*—Should further space be required for your answers, have the kindness to use paper of this size.

*The Visitor is requested to address his replies to T. Taylor, Esquire, Secretary, General Board of Health. It is not necessary to prepay the postage.*

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## APPENDIX D. 2.

### GENERAL BOARD OF HEALTH.

QUERIES.

Addressed to Dr. or Mr._____, Medical Officer in the Town Parish, City, or Union of_____

1. How long have you been employed as medical officer?
2. In what district were you employed?
3. What was the total number of cases treated by you of
   Diarrhœa?
   Cholera?
   Collapse?
   And how many died?

4. Can you form any opinion of the number of cases of Diarrhœa treated by you, which, but for prompt treatment, would have passed into developed Cholera?

5. Will you specify any particular sanitary evils in your district which have been brought to light during the epidemic?

6. In the course of your service have you discovered any place the sanitary arrangements of which were tolerably perfect, yet where, nevertheless, Cholera prevailed? Were the cases occurring in such localities exceptional cases or imported?

7. Has there been any, and what is the amount of, improvement in the sanitary condition of your district, effected since the outbreak of the epidemic? Has such improvement partaken of a temporary or permanent character?

8. Have the nuisances which you reported been abated, and to what extent? Have the poor complained much of nuisances, and of their inability — from want of efficient paving, draining, and scavenging—to remedy their condition?

9. Have cleansing works been instituted in the houses of the poorer classes where Cholera cases or deaths have occurred?

10. Were the chief causes of the localization of the disease in your opinion irremovable, that is, arising from unimprovable structural arrangements of property?

11. Will you state the local and removable causes in the district visited by you which have contributed to the localization and spread of the disease?



12. Has overcrowding prevailed, and to what extent?

13. Have you, during or towards the termination of the epidemic, observed any merging of Cholerine into fever without the disease passing into fully developed Cholera?

14. Have you observed any peculiarities in this epidemic distinguishing it from the previous epidemic or epidemics?

The medical officer is particularly requested to give an account of the sanitary condition of his district, as far as practicable, under the heads of—

1. Location and structure of houses?
2. Space allotted to dwelling houses?
3. House accommodation; that is, as to dust-bins, cupboards, coal-receptacles, sinks, fireplaces?
4. Lodging-houses, licensed and unlicensed?
5. House cleansing by drainage?
6. ——————— by removal of domestic refuse?
7. Public scavenging?
8. Privies and Cesspools?
9. Paving?
10. Street cleansing?
11. Nuisances, public and private?
12. Trades and occupations conducted so as to be public nuisances?
13. Water supply?
14. Ordinary sickness, disease, and mortality?

15. Extent to which district suffered from previous epidemics?

(Signed)
(*Stating Qualifications.*) Medical Officer.
(*Date.*)

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*Note.*—In replying to these queries, have the kindness to use paper of this size.

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*The Medical Officer is requested to address his replies to T. Taylor, Esquire, Secretary, General Board of Health. It is not necessary to prepay the postage.*

*Note.*—If any other point should deserve notice, it should be inserted at the end under the head of General or Special Remarks.

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APPENDIX E.

TABLE I.

TOWN, VILLAGE, OR PARISH OF _____

MEDICAL SUPERINTENDENT'S SUMMARY OF CHOLERAIC DISEASE TREATED BY MEDICAL OFFICERS.

*Summary of Medical Officers' Return from commencement of Outbreak on the* _____ *to* _____ *inclusive, in weeks.*

| Date. | District No. 1. | | | District No. 2. | | | District No. 3. | | | District No. 4. | | | District No. 5. | | | Total. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Diarr. | Chol. | Coll. | Diarr. | Chol. | Coll. | Diarr. | Chol. | Coll. | Diarr. | Chol. | Coll. | Diarr. | Chol. | Coll. | Diarr. | Chol. | Coll. |
| September 21 | 23 | 7 | 7 | 127 | 40 | 21 | 29 | 4 | 1 | 103 | 26 | 16 | 132 | 13 | 13 | 405 | 90 | 58 |
| " 22 | | | | | | | | | | | | | | | | | | |
| " 23 | | | | | | | | | | | | | | | | | | |
| " 24 | | | | | | | | | | | | | | | | | | |
| " 25 | | | | | | | | | | | | | | | | | | |
| " 26 | | | | | | | | | | | | | | | | | | |
| " 27 | | | | | | | | | | | | | | | | | | |
| GRAND TOTAL - | | | | | | | | | | | | | | | | | | |

(Signed) _____
Medical Superintendent.

* This Return should be constructed so as to form a corresponding Weekly Return with that of the House Visitation.

## APPENDIX E.

### TABLE II.

### TOWN, VILLAGE, OR PARISH OF _____

MEDICAL SUPERINTENDENT'S SUMMARY OF CHOLERAIC DISEASE DISCOVERED ON VISITATION.

*Summary of House-to-House Visitors' Return, from Commencement of Visitation on _____ to _____, Inclusive.*

| Date. | Number of Visitors. | District No. 1. | | | District No. 2. | | | District No. 3. | | | District No. 4. | | | District No. 4. | | | Total. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Diarr. | Chol. | Coll. | Diarr. | Chol. | Coll. | Diarr. | Chol. | Coll. | Diarr. | Chol. | Coll. | Diarr. | Chol. | Coll. | Diarr. | Chol. | Coll. |
| September 21 | 4 | 24 | 8 | 2 | – | – | – | 20 | 3 | – | – | – | – | – | – | – | 44 | 11 | 2 |
| „ 22 | | | | | | | | | | | | | | | | | | | |
| „ 23 | | | | | | | | | | | | | | | | | | | |
| „ 24 | | | | | | | | | | | | | | | | | | | |
| „ 25 | | | | | | | | | | | | | | | | | | | |
| „ 26 | | | | | | | | | | | | | | | | | | | |
| „ 27 | | | | | | | | | | | | | | | | | | | |
| Total - | | | | | | | | | | | | | | | | | | | |

(Signed) _____

Medical Superintendent.





## APPENDIX E.

### TABLE III.

### TOWN, VILLAGE OR PARISH OF _____

MEDICAL SUPERINTENDENT'S SUMMARY OF CHOLERAIC DISEASE TREATED AT DISPENSARIES.

*Summary of Dispensary and Medical Depôt Returns, from _____ to _____.*

| Date. | District No. 1. | | District No. 2. | | District No. 3. | | District No. 4. | | District No. 5. | | Total. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Diarr. | Chol. | Diarr. | Chol. | Diarr. | Chol. | Diarr. | Chol. | Diarr. | Chol. | Diarr. | Chol. |
| September 9 - - - | — | — | — | — | — | — | 2 | — | — | — | 2 | — |
| „ 10 - - - | | | | | | | | | | | | |
| „ 11 - - - | | | | | | | | | | | | |
| „ 12 - - - | | | | | | | | | | | | |
| „ 13 - - - | | | | | | | | | | | | |
| „ 14 - - - | | | | | | | | | | | | |
| „ 15 - - - | | | | | | | | | | | | |
| Total - - - | | | | | | | | | | | | |

(Signed) _____

Medical Superintendent.

N.B.—This Return should be constructed so as to form a corresponding Weekly Return with that of the Visitation.

## APPENDIX E.

### TABLE IV.

### TOWN, VILLAGE, OR PARISH OF _____

SUMMARY OF WEEKLY TOTALS OF DISPENSARY AND MEDICAL DEPÔT RETURNS.

| Date. | District No. 1. | | District No. 2. | | District No. 3. | | District No. 4. | | District No. 5. | | Total. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Diarr. | Chol. | Diarr. | Chol. | Diarr. | Chol. | Diarr. | Chol. | Diarr. | Chol. | Diarr. | Chol. |
| 9th Sept. to 13th Sept. inclusive | 6 | — | — | — | 56 | 6 | 1235 | 2 | — | — | 1297 | 8 |
| Total - - - | | | | | | | | | | | | |

In addition to the above, Medicines were administered to, or on behalf of, _____ persons at the Dispensary, from _____ to _____ 1854; and to, or on behalf of, _____ persons at the _____ Board of Guardians, and by the _____ public Medical Establishments of the Town.

(Signed) _____

Medical Superintendent.





## APPENDIX E.

### TABLE V.

### TOWN, VILLAGE, OR PARISH OF _____

MEDICAL SUPERINTENDENT'S SUMMARY.

*Comparison of Weekly Summaries of Cases of Choleraic Disease treated by the Medical Officers, and discovered by the House-to-House Visitors, from the _____ to the _____, in periods of seven days.*

| Dates. | | Diarrhœa. | Cholera. | Collapse. | Corpses. | Total. | Cases passed from Diarrhœa to Cholera. | Cases passed from Cholera to Collapse. |
|---|---|---|---|---|---|---|---|---|
| to | Medical Officers - | 1,848 | 328 | 333 | – | | – | – |
| both inclusive. | Visitors - - | 2,500 | 250 | 75 | 6 | 2,831 | 5 | 3 |
| to | Medical Officers - | | | | | | | |
| both inclusive. | Visitors - - | | | | | | | |
| Totals - - | Medical Officers - | | | | | | | |
| | Visitors - - | | | | | | | |
| Grand Total - - - - | | | | | | | | |

(Signed) _____

Medical Superintendent.

## APPENDIX E.

### TABLE VI.

TOWN, VILLAGE, OR PARISH OF _____

REGISTRAR AND SUPERINTENDENT REGISTRAR'S RETURN.

*Daily List of Deaths from Cholera and Diarrhœa in the District or Sub-District of* _____ *commencing from the* _____ *day of* 1854.

| Date of Death. (Dates to run consecutively.) | Place of Death. | Surname and Christian Name. | Age. | Sex. | Condition or Occupation. | Classification. | | | If Cholera make a C. If Diarrhœa make a D. |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Gentry. | Trades-men. | Artizans and Labourers. | Whether certified. (If so make a X.) |
| | | | | | | | | | |
| | | | | | | | | | |

Signature of Registrar _____

# ADDRESS

DELIVERED IN THE HALL OF

MARISCHAL COLLEGE, ABERDEEN,

ON OCCASION OF HIS INSTALLATION AS

LORD RECTOR OF THE UNIVERSITY,

5TH NOVEMBER 1835.

BY

JOHN ABERCROMBIE, M.D. Oxon. & Edin. V.P.R.S.E.

FELLOW OF THE ROYAL COLLEGE OF PHYSICIANS OF EDINBURGH;
ASSOCIATE OF THE ROYAL ACADEMY OF MEDICINE OF FRANCE;
AND FIRST PHYSICIAN TO HIS MAJESTY IN SCOTLAND.

ABERDEEN: ALEXANDER BROWN AND CO.
WILLIAM WHYTE AND CO. EDINBURGH; AND LONGMAN, REES AND CO. LONDON.
MDCCCXXXV.

PRINTED BY DESIRE OF THE SENATUS ACADEMICUS.

Edinburgh: Balfour & Jack, Printers, Niddry Street.

# ADDRESS, &c.

I FIND it impossible to express, as I ought, the feelings with which I appear before you, in entering upon the duties of the distinguished office to which you have been pleased to call me in so flattering a manner. Allow me, in the first place, to express my most grateful thanks, and to assure you, that I appreciate most highly this distinction, and feel most warmly the honour you have conferred on me. Of my ability to discharge the duties of the office, I must speak in the most guarded terms; but I may express, with greater confidence, my earnest wish to discharge them, and my earnest desire to contribute, if it were in my power, towards advancing the interests, and promoting the usefulness, of this ancient and venerated seat of learning. My earliest and most tender recollections are closely associated with it; and the hall, in which we are now assembled, recalls, with that kind of feeling which is pleasing yet mournful, the memory of years which are long gone by,—of fellow-

students who have been cut off in the midst of their days,—and of eminent and revered preceptors who have finished a course distinguished alike by their talents and their virtues. This ancient fabric itself is now mouldering into decay, but I rejoice in the prospect which is before us, of seeing it reared in new splendour; and I trust the time is not far distant, when we shall lay the foundation of another Marischal College, and unite our earnest prayers to the Giver of all good, that it may rival these ancient walls in celebrity and in usefulness.

The University of Marischal College has long held a very high place among our schools of literature and science; and its character has been supported by a succession of eminent men, whose names are well known and highly honoured among the great promoters of truth. Without going beyond the recollection of the present generation, I need only mention Campbell, Beattie, Brown, Stewart, Hamilton, Copland, to whom, with various others, some of us look back with respect bordering on veneration, and who are deeply associated in our minds with our first introduction to the delights of literature and the wonders of science. Their places are now occupied by individuals eminently qualified for the various departments to which they have devoted themselves, and eminently fitted both to enlarge the



boundaries of science, and to extend the reputation of the seminary which has the benefit of their talents. In this slight allusion to them, I shall only express my sincere regard for them as a body and as individuals, and my earnest wishes for their personal happiness and the long continuance of their invaluable labours. Under their instructions, may you, my beloved young friends, grow up in all that sound knowledge, and that true culture of the mind, which shall qualify you, in your progress through life, for extensive respectability and extensive usefulness.

The course of elementary instruction, which has long been pursued in Marischal College, is admirably and peculiarly calculated for laying a sound foundation in the various departments of knowledge;—and those, who improve the opportunities which are here afforded to them, will, I am persuaded, have reason, in after life, to look upon the years which they have spent in this place, as a period productive of inestimable results in their mental discipline and moral culture. But, that these important results may be accomplished, it is necessary that you not only pay minute attention to the various branches of knowledge which are here presented to you, but that you bear in mind the higher purpose which all science ought to serve, in the culture of the understanding itself, and in qualifying it for the attainment

of truth,—particularly for the acquirement of those great and ultimate truths, by which science ought to lead us to the omnipotent and eternal cause. Philosophy fails of its noblest object, if it does not lead us to God;—and, whatever may be its pretensions, that is unworthy of the name of science, which professes to trace the sequences of nature, and yet fails to discover, as if marked by a sunbeam, the mighty hand which arranged them all; which fails to bow in humble adoration before the power and wisdom, the harmony and beauty, which pervade all the works of Him who is eternal.

But all that is furnished by early study gives only the elements for forming the mind, and for gradually training it to that intellectual vigour and moral discipline by which it may be prepared for farther and greater pursuits. While, therefore, you prosecute with ardour the various departments of science, you will remember that a higher and more extended object is still before you. You will feel the necessity of rising above the details of individual sciences, to those results to which all science ought to combine in leading us,—the culture of the understanding itself,—and the practical application of those rules by which the mind may be directed towards the discovery of truth, and by which the truth



so discovered may be applied to the actual duties and responsibilities of life. You will learn to estimate the value of that greatest of all acquirements, a well-regulated mind, and to study with anxious care what those qualities are which constitute such a mind, and what are the particular pursuits, and the mode of conducting them, which are best adapted for the high attainment. You will learn to estimate the benefits which arise from such a regulation of the mind,—to see how, in every inquiry, it tends to conduct us to truth,—how it leads the mind to apply itself to various pursuits with a degree of attention adapted to their real value, and to follow out the inductions of each to its last and highest object,—the culture of the moral being.

Judging upon these principles, we are taught to feel that life has a value beyond the mere acquirement of knowledge, and the mere prosecution of our own happiness. This value is found in those nobler pursuits which qualify us for promoting the good of others, and in those acquirements by which we learn to become masters of ourselves. It is to cultivate the intellectual part for the attainment of truth,—and to train the moral being for the solemn purposes of life, when life is viewed in its relation to a life which is to come. These exalted pursuits are not more conducive to the great objects which are presented to us as moral and respon-

sible beings, than they are calculated to promote our own happiness and peace. Constituted as we are, indeed, and placed in certain relations to objects of sense, and to other sentient beings, we are, in some degree, under the influence of external things. But the powers which wield the destiny of our happiness are chiefly within. It is there that we trace the elements of those noble faculties, which, if duly cultivated, secure at once our usefulness and our happiness ;—and it is there that we find the germs of those vulture passions whose dominion is worse than eastern bondage, and, under whose relentless tyranny, a man who is master of the world may be himself a slave. In the conquest of these, consists the highest dignity of our nature,—and in the control and subjugation of them is our only solid peace.

Among the phænomena presented by human character, none will strike you as more remarkable than the various objects which men propose to themselves in life. In all, a certain vision of happiness seems to float over the scene ;—but how various are the courses by which the phantom is pursued,—and how many enter upon the pursuit without proposing to themselves any definite course at all. They never seem distinctly to put to themselves the question, in what the imagined enjoyment consists, and what are the elements by which it is



constituted. One expects to find it in wealth,—another in power,—a third in rank,—a fourth in fame,—while not a few are found to seek it in a mere round of excitement, perishing with the hour which gave it birth. Thus a large proportion of mankind pass through life, pursuing an imagined good which too often eludes their grasp,—or which, even after it has been attained, is found incapable of giving satisfaction. They live upon the opinions of other men, and are thus left at the mercy of a thousand external circumstances, by which the good they had so long pursued is blasted in the enjoyment. They enter upon life without forming any definite conception of what the great business of life ought to be ;—and, when they perceive that it is drawing to a close, they look back with astonishment to find that it has passed over them like a dream,—that they cannot say for what purpose they have lived,—or perhaps are compelled to acknowledge that they have lived in vain.

But life presents another aspect, when we view it as a scene of moral discipline ;—when we look not at its pains and its pleasures, but its high duties and its solemn responsibilities,—and at the discipline of the heart, from which springs a true and solid happiness which external circumstances cannot destroy. All then is defined and clear. The object is definite, and the

way to it is marked as by a light from heaven. Each step that is gained is felt to be a real and solid acquirement; and each imparts a sense of moral health which strengthens every principle within, for farther progress. I know that I carry your best feelings along with me, when I thus call your attention to that course of life, which alone is adapted to its real and solemn importance,—which alone is worthy of those powers of our intellectual and moral nature with which we have been endowed by Him who formed us. In the culture of these is involved not only a duty and a responsibility, but a source of the purest and most refined enjoyment. For there is a power which is calculated to carry a man through life, without being the sport and the victim of every change that flits across the scene;—this power resides in a sound moral discipline, and a well regulated mind.

The foundation of all mental discipline, in the words of an eminent writer,* consists in the "power of mastering the mind." It is in having the intellectual processes under due regulation and control,—and being able thus to direct them, upon sound and steady principles, to the acquisition of useful knowledge, and the

* M. Degérando.



discovery of truth. Here we are, in the first place, reminded of that remarkable power which we possess over the succession of our thoughts. We can direct the thoughts to any subject we please, and can keep them directed to it with steady and continuous attention. In the due culture of this power consists a point in mental discipline, of primary and essential importance. By the neglect of such culture, the mind is allowed to run to waste amid the trifles of the passing hour, or is left the sport of waking dreams and vain delusions entirely unworthy of its high destiny. There is not a greater source of difference between one man and another, than in the manner in which they exercise this power over the succession of the thoughts, and in the subjects to which these are habitually directed. It is a mental exercise which lies at the foundation of the whole character. He who, in early life, seriously enters upon it, under a sense of its supreme importance;—who trains himself to habits of close and connected thinking,—and exerts a strict control over the subjects to which his thoughts are habitually directed,—leading them to such as are really worthy of his regard, and banishing all such as are of a frivolous, impure, or degrading character,—this is he who is pursuing the highest of all earthly acquirements, the culture of the understanding, and the discipline of the heart.

Now, it cannot be too anxiously borne in mind, that this great attainment is, in a remarkable degree, under the influence of habit. Each step that we take in the prosecution of it will facilitate our farther progress,—and, every day that passes over us, without making it the object of earnest attention, the acquirement becomes the more difficult and the more uncertain;—and a period at length arrives, when no power exists in the mind capable of correcting the disorder which habit has fixed in the mental economy. The frivolous mind may then continue frivolous to the last, amusing itself with trifles, or creating for itself fictions of the fancy, no better than dreams, and as unprofitable: The distorted mind may continue to the last eagerly pursuing some favourite dogma, while it is departing farther and farther from truth: And the vitiated and corrupted mind may continue to the last the slave of its impure and degrading passions. Such is the power and such the result of mental habits;—and let us ever bear in mind how such habits are formed. They arise out of individual acts of the mind; and we have not the means of determining what number of such acts are necessary for forming the habits,—and at what period these may acquire a mastery which shall peril the highest interests of the mind. We cannot determine how many instances of frivolity may constitute the permanently frivolous mind;—how many trains of impurity may constitute the permanently corrupted mind;—or what degree of inattention to the diligent culture of the powers within may be fatal to the best interests of the man, both as an intellectual and a moral being. Hence the supreme importance of cultivating in early life the mastery of the mind,—and of watching with earnest attention the trains of thought which we encourage there, as we cannot determine at what period a habit may be formed, the influence of which shall be permanent and irremediable.



When we take this extended view of that which constitutes sound intellectual culture, we perceive that it does not consist in the mere acquirement of knowledge, however extensive that knowledge may be; for this may be an exercise of memory alone. We feel that there is a culture of the higher powers of the mind, of greater difficulty, and greater importance far, without which knowledge is vain: This is a due regulation of the various mental faculties themselves, so that each may perform its proper office upon the knowledge we have acquired; that the various powers within may observe a healthy relation towards each other; and that from the whole, there may result a due influence upon our motives and principles of action, as moral and responsible beings. Without attention to these con-

siderations, a man may accumulate a mass of knowledge which yields him no real advantage;—he may have gone the round of the sciences, commonly so called, while he has made no progress in that higher department, the knowledge of himself.

The great principle of self-government, therefore, consists in calling ourselves to account, both for what we know, and for what we do, and for the discipline which we exercise over the processes of our minds. It consists in questioning ourselves rigidly, what progress we are making in important acquirements,—what are the subjects which chiefly occupy our attention,—whether these are such as are really of adequate value, or whether, amid undue devotedness to some favourite pursuit, others of higher importance are overlooked and forgotten; or whether, under a habit of listless vacuity, and inactivity of mind, we may be allowing the best of our days to creep on without eager attention to any solid acquirement at all. It consists in questioning ourselves in the same manner, what opinions we have formed, and upon what grounds we have formed them; whether they have been received from others without examining for ourselves, or after a slight and partial examination, directed it may be by some previously formed prejudice,—or whether they have been deduced from a full and fair examination of all the facts which



ought to be taken into the enquiry. It consists, finally, in scrutinizing our mental habits, our moral feelings, and our principles of action;—what are the subjects to which our thoughts are most habitually directed;—what the motives which chiefly influence our conduct;—what the great objects which we propose to ourselves in life;—what place among these have the principles of selfish indulgence, personal distinction, or mere human applause;—and what place have those exalted principles which spring from a higher source, and rise to that elevation from which they spring,—a spirit of devotedness to Him who made us,—and views and feelings which point to an existence beyond the grave.

A leading defect in many characters, and one which lies at the foundation of much and serious imperfection, both intellectual and moral, is the want of this habit of self-inspection. This deficiency is not confined to the listless and vacant mind, which allows life to glide over it amid frivolities and waking dreams. It may be found in those who are intensely and actively occupied with external things. It may be found alike in the laborious student, who is eager in the pursuit of knowledge,—and in the active man of the world, who, engrossed with the affairs of the living scene which is moving around him, has neglected the wondrous scene that is passing within,—has never cultivated the

rigid scrutiny of his own intellectual and moral temperament. The truth, indeed, seems to be, that, after a certain period of life, few have the hardihood thus sternly to look within. For a high degree of moral courage is required to face the disclosure which awaits the mind, when it is thus turned inwards upon itself;—a disclosure, it may be, of the result of years and years that have passed over it, in listless inactivity, which yields nothing to reflection but an empty void; or in the eager pursuit of objects which are seen to be worthless; or in the acquirement of habits which are felt to be destructive of the health of the mind;—the disclosure, it may be, of important duties neglected, and important pursuits overlooked, and the conviction that life is drawing to a close while its great business is yet to begin. Few have moral courage to meet this disclosure; and, when it is met, with an attention in some degree adequate to its supreme interest, the impressions which it yields are encountered by the force of confirmed moral habits, which seem to claim every faculty and feeling of the mind as theirs by hopeless bondage. Hence the supreme importance of cultivating in early life the habit of looking within; the practice of rigidly questioning ourselves as to what we are, and what we are doing,—what are our leading pursuits, and what our mental habits; what are our



plans and prospects for life, and what influence over the whole of our moral discipline, have the solemn realities of a life which is to come. What I have called the power of mastering the mind, consists, if I may use a strong mode of expression, in compelling it to listen to such a course of interrogation as this; and compelling it to return distinct and definite answers. Each hour that, in early life, is spent in such an exercise, is fraught with results of greater value than aught that the world can give. The exercise is gradually confirmed into a mental habit; and, under the influence of a power from on high, the consequences are likely to be such as reach beyond the narrow limits of time, and extend into eternal being.

The regulated condition of the mind, which has been the subject of these observations, is applicable to every situation in which a man can be placed in life, and leads him to feel his way through its various pursuits and responsibilities in a manner adapted to the requirements of each of them. But it more properly belongs to the aim of my present suggestions, to mark its influence upon the progress of the mind itself;—and, in this respect I may allude, in a very few words, to its remarkable bearing upon three leading objects of mental discipline,—the acquisition of knowledge,—the for-

mation of opinions,—and the culture of those moral emotions of the heart, which are the last and highest object to every responsible being.

I. A regulated condition of the mind contributes, in a most material degree, to our progress in knowledge. In this respect, it is, in the first place, the source of a quality which ought to be carefully cultivated in early life, which I may call *mental activity*. This consists of an eager inquiring state of mind, ever on the watch for information from any source from which it can be drawn—and ever anxious to make its information more correct and more extensive. It leads to a habit of observation, by which we learn to derive knowledge from all that is passing around us. It teaches us, farther, to direct this mental activity in a proper manner, by selecting such objects as are really deserving of our regard, and by directing the mind to them with a steady and continuous attention, so that we may acquire a full and connected knowledge of all the facts and their relations to each other,—and thus prepare them for the conclusions, or general principles, which they are calculated to yield. It thus tends to preserve us from frivolous pursuits, by leading us to a steady culture of those which are of real importance, and with an eager and persevering attention adapted to their true value.



For, among many pursuits, no man can excel in all; and the foundation of eminence is a due selection, and a leading direction of the mind to those which are thus selected. You will be at no loss to discover around you, remarkable and instructive examples of the effects produced by the want of this sound discipline of the mind. One you will find dreaming through life, without directing himself with energy to any object,—a second wasting his powers, perhaps of a superior order, in a desultory application to a variety of studies, without excelling in one,—while a third devotes himself with eagerness and zeal to some favourite pursuit, neglecting others which really merit his chief regard.

Closely connected with the habit of mental activity is the habit of reflection on the relations of the facts which are acquired,—leading us to observe their connections, and the conclusions which they yield;—and the habit of association,—referring facts to others with which they bear an analogy, and to principles or opinions which they tend to confirm, modify, or overturn. It teaches us also to trace among facts the relation of cause and effect, and to deduce from them general conclusions or general principles, the last and main object of science. Now, the whole of this course of mental activity is productive not only of intellectual improvement, but of the highest mental enjoyment,—

while the frivolous, or ill-regulated mind, is not only fatal to improvement, but is a burden to itself, and, as life advances, becomes its own tormentor. Let, then, the eager desire of knowledge carry you above those pursuits which waste the best years of so many around you, and leave them, even to the close of their days, the victims of frivolity still.

II. The second great mental operation, in which is felt the value of a regulated mind, is the formation of opinions. Here various errors are committed, but all of them are of serious moment. There is a listless vacuity of mind which prevents it from being directed with attention or interest to the formation of defined opinions, even on subjects of supreme importance. There is a servility of mind which leaves it the slave of mere authority, without forming opinions for itself by personal inquiry. And there is a rude and reckless affectation of mental independence, or liberty of thinking, which leads a man to despise authority, to aim at striking out for himself a system distinguished from the received opinions of those around him,—led, it may be, by a love of singularity or the vanity of appearing wiser than his neighbours;—or perhaps, impelled, by the condition of his moral feelings, to argue himself into the disbelief of what he wishes not to be true.



From all such distortions of the understanding a regulated mental discipline tends to preserve us. It induces us to approach every subject with a sincere and humble desire for truth;—to give its due influence to authority, without being blindly led by it,—to give its due weight to every kind of evidence, without partial views or imperfect examination,—and to direct the whole powers, not to favour, establish, or overturn particular opinions, but honestly and anxiously to discover what is truth.

This is a subject of intense and solemn interest. A slight attention to the philosophy of it will enable you to perceive its true bearings upon us as responsible beings,—and how, on the highest of all subjects, a man may incur moral guilt in the formation of his opinions. Both as intellectual and moral beings, the great agent by which we are acted upon, is *truth*. Truth derives its power from evidence; and there are laws of evidence which, in their nature, are as absolute and immutable as the laws of physical relations. But for the operation of them, a state of the mind itself is required, and without this, even the best evidence may be deprived of its power to produce conviction. For the result of evidence upon the mind depends on close and continued attention; and this is a voluntary process which every one may be able to perform. It is on this ground, therefore, that we hold a man to be re-

sponsible for his belief,—and contend that he may incur deep moral guilt in his disbelief of truths which he has examined in a frivolous or prejudiced manner,—or which, perhaps, he indulges in the miserable affectation of disbelieving, without having examined them at all. The remarkable fact, indeed, appears to be, that the chief source of unbelief, on the greatest of all subjects, is generally to be found in a previous moral corruption of the mind. It arises from no defect of evidence, but from a state of mind on which the highest falls without power. This striking moral process begins by a man renouncing the guidance of sound moral principle, and the restraints of religious truth, both on his conduct and on the discipline of his heart. The great truths which he thus violates are then repelled as intruders, which disturb his mental tranquillity; and, from this stage in his downward progress, the career is short, and the mental process simple, by which he succeeds in driving the belief of them from his mind. Such is the wondrous economy of the human heart,—and such is the history of many a man, who, after a certain course of moral degradation, has sought refuge in infidelity.

III. But I must leave this deeply important subject, and hasten to offer a very few remarks on the third of



the topics to which I have alluded,—the influence of a regulated mind on the moral emotions of the heart. In these consists the highest state of man,—his soundness as a moral being; and there flow from them, by direct and natural sequence, all those affections and motives of action which guide his conduct to his fellow-men,—and those nobler emotions still which raise the feeble and finite being to Him the infinite and eternal. In the culture of these are involved not only the chief dignity of our nature, and our prospects as moral and responsible beings,—but also, in an equal degree, our present sound and solid happiness. They constitute that true wisdom, of which we are entitled to say, on the best of all authority, "her ways are ways of pleasantness, and all her paths are peace."

Here we are reminded of that remarkable principle which pervades the whole economy of the mind,—the intimate relation which exists between the moral emotions and intellectual processes over which we have a direct and absolute control. As moral and responsible beings, the power by which we are acted upon is truth. But all truth must first be presented to the understanding,—and being, by an appropriate process of examination, received into the mind, it is then, by a voluntary exercise of attention and reflection, to be applied in such a manner as to produce its proper influence on the

moral emotions of the heart. It is thus that a beautiful harmony and consistency pervade the whole economy of the mind, eminently worthy of Him who made it;—and it is thus that a solemn responsibility attaches to ourselves, in regard to those emotions of the heart over which we have not a direct control. It is precisely the same principle to which I have already referred, respecting the responsibility of man for his belief. He cannot believe as he wills, by any direct effort of his mind;—yet a deep responsibility attaches to him in the formation of his opinions: And he cannot call forth at his bidding the moral emotions of the heart; but the deepest guilt may be involved in the absence of them; because, by an established economy of his mind, they arise out of processes of the understanding, over which he has an absolute power, applied to truths which, under a higher influence, are calculated to exert a direct control over the moral emotions of the heart. This part of the mental constitution is worthy of the deepest attention of every one, who appreciates that most essential of all pursuits, the culture of the moral feelings. It is by means of it that truth, which is received by a process of the understanding, is made to exert its power in controlling the tempests of the heart: It is by means of it that we can invite and cherish mental images and trains of thought, which tend di-



rectly to the highest purposes of our moral culture;—and can banish those which have an opposite tendency, as enemies which would poison the springs of moral health, and peril the safety of the moral being.

And what are the truths which, under a supreme influence, our intellectual nature is thus to use as the engines of a power to control and regulate the emotions of the heart. They are those which refer to the attributes of God,—and our relation to him as the creatures of his hand, moral, responsible, and immortal. They rest upon evidence so extensive and so varied, that its authority will be best appreciated by those who have made the greatest attainments in the laws of rigid inquiry. This evidence is above us, and within us, and around us. Every step that we take, amid the wonders of creation without, leads us to new discoveries of the power, and wisdom, and goodness of Him who called them into being by his word, and maintains them all in undeviating harmony. When we turn our attention within, we read in the moral impressions of our own minds, or, in other words, in the light of conscience, his attributes of holiness, and justice, and truth. And, meeting with difficulties in the book of natural religion, we have only to turn to the page of revelation, where all these difficulties are removed, and the divine character is displayed with a harmony and

consistency which carry conviction to every candid mind. We have there disclosed the wondrous provision which has been made by infinite wisdom, and infinite mercy, for the restoration of man from his state of moral ruin,—and a power adapted to his moral weakness,—and a light to shine upon his moral darkness,—and a code of ethics more high, more pure, and more extensive far, than ever was contemplated by the wisest of men. The whole is supported by a weight of evidence which fixes itself upon the mind with irresistible power,—and, with a tone of authority, it calls our attention to all the responsibilities of life, and all the realities of a life which is to come.

Such are the truths, which, as moral causes, are calculated to act upon the mind, and thus to control and regulate our emotions, and our whole character, as moral and responsible beings;—and it is of the utmost consequence that we attend to the philosophy of that process by which they may be made to answer this great purpose, and without which it may be entirely lost to us, with all its important results. This is an exercise of attention and reflection, over which every man feels that he has a voluntary control. The truths are endowed with certain tendencies which are as uniform as the operation of physical causes; but their actual efficiency is closely connected with this exercise of the



mind itself; and it is thus, that, by ignorance or inattention, a man may incur the deepest guilt, in the want of that moral culture, the great agents of which are thus presented to him, and pressed upon his attention as a rational being. Now, the truths to which I have thus referred are usually called objects of faith,—and you will often find a distinction made between objects of reason and objects of faith,—as if the latter were, in some respect, inferior to the former in their evidence and stability: But this is entirely without foundation. The truths which are the objects of faith are properly so called, because they do not come under the cognisance of any of our senses; but they are as directly addressed to the understanding as the most obvious inductions of physical science; and they carry with them a weight of evidence, as direct and incontrovertible, to every mind which is open to its power. This evidence, indeed, is of a different character, but its strength and its authority are the same. The truths themselves are calculated to engage the highest powers of the mind; and the most exalted understanding, that ever dwelt in human form, will derive from them a new feeling of intellectual vigour and moral health, by which it shall wing its way to those regions where shine forth in a peculiar manner the divine perfections; and shall there prostrate these highest powers in devout and humble adoration of

Him, who was, and who is, and who is to come. This, and nothing less than this, is true philosophy; for it is this alone that traces the phenomena of nature to their cause; it is this alone that takes within its grasp the whole range of truth, and places fairly and deliberately against the mere objects of sense, those great realities which are the objects of faith.

Let it then be your study in early life, to cultivate that sound condition of the mind, by which its powers are not kept in bondage to the mere objects of sense, but are trained to the habit of bringing down upon it the habitual influence of the truths which are the objects of faith. Devote yourselves with eager enthusiasm to the high acquirements of science; but cultivate also that habit of the mind by which science shall continually lead you to the eternal cause. And, while you are taught to follow the planet through the wondrous regularities of its movements,—when you find the comet, after being lost for a century, returning at the appointed period from the solitudes of its eccentric orbit,—when you extend your view beyond the system in which we move, and penetrate into that field in which ten thousand other systems revolve around ten thousand other suns in ceaseless harmony,—Oh rest not in a cold recognition of the facts, but take one



single step, and say,—"These are thy wondrous works, —thyself how wondrous:"—And rest not here, but take yet another step, and recognise this Being as the witness of all your conduct,—as the witness even of the moral condition of the heart:—Seek after purity of character, for you cannot go where you are not followed by that eye; aspire after purity of heart, for that eye extendeth even there:—And, feeling your inability for this mighty undertaking, seek continually a power from God,—a power which he alone can give, a power adapted to your utmost want, and which is promised to every one that asks it. In your progress through life, indeed, you will not fail to meet with those by whom this momentous truth is treated with derision, as the vision of fanaticism, unworthy of a philosophical mind. But never allow yourselves to be imposed upon by names; and never suppose there can be any thing unphilosophical in the belief, that an influence should be exerted on the mind by Him who framed the wondrous fabric:—And be assured you follow the dictates of the most exalted philosophy, when you commit yourselves to him as the guide of your youth; when you resign yourselves to that guidance, and ask that powerful aid, both for your conduct through this life, and your preparation for the life which is to come.

# OBSERVATIONS

ON

# STOPPING TEETH,

AS

A MEANS OF PREVENTING THEIR LOSS, AND AVERTING THE MORE SERIOUS AND PAINFUL OPERATIONS.

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BY

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"If preservation be as good as a cure, this is as good as both; for the operation of stopping, when properly performed, is both preservation and cure."—DR. E. FARRELY.

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# INTRODUCTION.

The following pages are written to popularize, advocate, and explain, the most valuable, at the same time the least appreciated and understood, of any operation within the province of the Dental Surgeon. If it be to the weal of the patient and credit of the Surgeon to cure, than to amputate a limb, so exactly in the same light should the preservation of a tooth be regarded, rather than its extraction, and substitution of an artificial one. It is far from our purpose to attempt to eulogise conservative dentistry at the expense of the mechanical, but simply to elevate the former in the estimation of the public. Little need be said in support of the latter. So vast and rapid have been its strides to the position it now holds, that the faint murmur of false delicacy has long since been outstripped and forgotten, while neglected and toothless mouths are almost entirely confined to the poor. But this excellence has not been

unattended with evil. The public have hitherto been led to regard the Dentist as one who merely extracts and makes artificial teeth. The Dentist, finding his services chiefly sought for these purposes, has been too often prone to neglect the most important branch of his art—the *preservation* of the teeth. Little practice produces little skill, so little skill entails little practice; that when a tooth has been stopped, it is frequently so indifferently done, as to be wholly ineffectual and delusive. The patient very naturally becomes incredulous as to its efficacy, and with some show of reason conceives it to be simply "putting off the evil day" by a means little short of chicanery.

We have no novel theories to promulgate, patented instruments or "methods" to astonish, or wonders of any sort to amaze or astound; but merely call attention to the possibility and advantage of realising in its fullest and broadest sense the trite and simple fact, "*to prevent is better than to cure.*"

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OBSERVATIONS

ON

# STOPPING TEETH.

It may be deemed superfluous to devote much space or many words to the value, nay, the necessity, of a pe.fect denture. But as most of the works extant have expatiated thereon simply as prefatory to the benefits arising from their replacement when lost, and as it is the design of this pamphlet to grapple with the subject at its source rather than its climax, to prevent rather than to cure, we may venture to pass cursorily over the ground again.

Health, appearance, articulation, comfort; each of paramount—often vital—importance. Of which would we consent to be deprived? Which could we see slowly but surely forsaking us, and not

make an effort to retain? How then shall we stand with indifference and see *all* mercilessly assailed, and permit the destroyer to ravage on at will; removing stone after stone from the fair structure, till the stalwart man of thirty in a few years is transformed into the prematurely wrinkled, dyspeptic, mumbling old man. Can a mill grind without stones? Can beauty be conceived without teeth? Can that mightiest of human gifts—eloquence, proceed unbroken from a broken source? An exquisite piece of mechanism exist without perfect harmony in every part? A delicate fabric be built of crude and unwrought materials? To remark the common indifference, we might almost anticipate the reply, "All this! ay, more." But facts speak plainer than words. Time draws the picture which fact grimly colours, and experience points us to. Such things are. And the questions arise, how is it to be accounted for, how to be averted? The evil, like most, and the worst, usually lies at our own doors; and the remedy alike is generally within our grasp. The sea was not given us without a compass, poisons without antidotes, disease



without medicines. Many will perhaps briefly remark, "My teeth are neither good nor regular, but I can masticate, and that's near enough for me." We answer, They might be both, and serve as well. Another will observe, "I have not many, but I can eat." We answer, A few less, and you would have none. Another piteously adds, "I once had a good set, but I neglected them; now I have none; what would I not give for only two of them back again!" Commiseration is all we have for them. A fourth will boldly tell us, "I don't trouble about mine; I let them take their chance; and when they ache I have them out." We ask, Would you treat any other part or member of your body with as little consideration—allowing the most evident disease to proceed in an eye, or a finger, till there was no remedy but its removal? Why then this prodigality with the teeth? If, merely, that we have a few more, the reason is truly a wretched one. If that they can be so readily and artistically replaced by artificial mechanism, the argument, to be valid, should also apply to other members—logic, the deduction of which all would be un-

willing to be compelled to adopt. On witnessing the singular apathy with which incipient disease in the teeth is looked upon, it might be questioned, had the teeth been joined together in such a manner that each jaw contained but one semi-circular tooth, necessitating on its being decayed the removal of the whole or constant torture, whether the community at large would have been gainers or losers. It is very certain they would then have obtained a much larger share of attention, and the first indication of decay regarded with as much terror as a spot upon the pupil of the eye. Nature, however, who has done all for the best, seems by having given us many, to have anticipated our negligence, and so been content to restrict the penalty to merely the loss of the one we may have unfortunately neglected.

It is not the intention to imply that every tooth is lost through negligence. Our burden of responsibility is usually sufficiently weighty, without adding any gratuitous increase to the bulk. But that eighty per cent. of the teeth



which are extracted are lost through sheer carelessness, is undoubtedly true.

The primary source of their destruction often lurks far beyond the reach of human interposition —in the original development of the enamel; a matter over which we have no more control than the moulding of our features. But when the permanent denture is being established, the responsibility begins. Regularity of the second set can always be obtained with a little timely attention—not officious interference. But, as has been remarked, the perfect or imperfect development of the enamel is exclusively Nature's prerogative. It is with this we have to do.

Take, for example, the mouths of two children of about fourteen or fifteen years of age. We examine one, and probably find the jaws well arched, the front teeth bright, smooth, and regular, the molars with thick, well-developed enamel, with few and slight depressions only on the grinding surfaces. This case we may dismiss with the recommendation of a good tooth-brush, and

plenty of water twice or thrice daily. We pass to the second :—Here a different state of things may be present. The jaws small and contracted, teeth crowded and approximating at every possible angle, and the grinders with deep pits and furrows intersecting their crowns. If a fine probe be passed over the surfaces, here and there it will drop into a minute orifice at the apex of the pits, entirely devoid of enamel, although to the casual observer they would pass for sound teeth. If these teeth be again examined in the course of about twelve months, a change will be apparent. The fissures or furrows before noticed, will now exist as deep, sharp, discoloured lines, ramifying across the crowns, often intersecting each other, or diverging from a common centre—a small dark cavity, the minute orifice previously detected by the probe. A subtle process of destruction has been at work in the interim. Small particles of food have been forced in mastication into these minute crevices, which the most diligent tooth-brush will often fail to remove. Aided by the warmth and moisture of the mouth, its decomposition is brought about, and a minute quantity of acid is



generated, destructive to the bone of the tooth. It burrows under, and undermines the enamel, which at length, deprived of its support, suddenly gives way and breaks in, revealing a cavity hitherto wholly unsuspected, and which the uninformed will often imagine has been produced in a few days, or to have commenced internally; which, however, has been the slow and subtle work of many months. Such teeth, if not immediately treated, will inevitably be lost. Every week will be of infinite importance. Now that the enamel has been removed, and the substratum of bone laid bare, food and saliva freely enter, decompose, and become offensive, and the destruction of the tooth is rapidly effected. A few days or weeks are often now sufficient to place it beyond conservative treatment. The nerve is soon exposed, tooth-ache follows, and extraction is then but too often the only effectual remedy.*

* Cases occasionally occur in which this theory is thought untenable. Such, for example, as those in which the decay attacks a tooth on a smooth or convex surface, or at the free edge of the gum, or even the very apices of the molar cusps. But these are comparatively rare, and are attributable, as the commoner cases, to defects in the early formative process, producing

This, although the ordinary cause, is not the only one brought about for their destruction. Common caries, or decay, being however the grand enemy, it is to that we have more particularly to direct attention.

It would be well for both patient and Dentist were decay restricted to the grinding surfaces of teeth. It is there that we can put on it the most certain and effectual check. But unfortunately it too often attacks them at their approximation—between. It is unfortunate for three reasons:—That it there generally involves the two teeth; That from its obscure situation far greater ravages can be effected without the same chance of early detection; That such cavities occupy thrice the time, are thrice as much trouble, without an adequate chance of making a good and solid stopping.

an enamel faulty in quality or quantity, easily broken up by vitiated secretions of the mouth, engendered by debility or functional derangement. And as all decay, no matter where present, or what its cause, is productive of the same result,—viz., the enamel and bone are destroyed, and a cavity is formed which increases by exposure and the retention of decomposing food,—the rationale of the remedy we are pointed to is the same.



Much, however, may be done by the parent towards securing a good denture, by the strictest attention to the health of the child at the period when the development of the *permanent* set is in progress, while yet within the gums. This commences as early as the first month after birth. If the child be weakly, and subject to malassimilation of its food, resulting in wasting, acidity, or indigestion in any of its various phases; also measles, scarlet fever, or any affection producing great constitutional disturbance, at this, or a subsequent period of infancy, it is almost certain to bear with it well-defined and unmistakeable evidence on the teeth in after years, by their more or less imperfect structure. It is most common to observe the surfaces of the second set presenting annular ridges and depressions, also rings or rows of small pits, called, in lieu of a more scientific but not more expressive nomenclature, "honey-comb" decay (a disease of importance, inasmuch as it admits of no remedy); all bearing unerring testimony and even data, of an infringement of Nature's laws, laws which even in the adult brook no invasion without a penalty. But when the scene of strife is the

delicate frame of the babe—when paps and starchy foods are substituted for Nature's nourishment, the feeble powers struggle, but eventually succumb, and time tells the tale of wrong the little sufferer would fain have told.

Irregularity of the permanent set, although of less serious consequences than defective and carious teeth, is a matter of vast moment and interest.—Moment, inasmuch as how often do we find an otherwise fine countenance, or noble eloquence, marred and distorted by an irregular tooth.—Interest, that it is almost wholly under the control of the patient. A little judicious timely attention while the teeth are coming through the gums, and arranging themselves in their several positions, is all that is needed. With this, rectifying plates, and all such contrivances, might be almost things unknown. It is true a case will occasionally present, requiring mechanical interference, even when the utmost attention has been given; but such are so rare as scarcely to be worthy of notice. In nineteen cases out of twenty, it is simply the result of ignorance or



negligence, or the blundering of an incompetent adviser.

We turn again to decay and its remedy—Stopping. "If," as Dr. Parmly has observed, "preservation be as good as a cure, this is as good as both, for the operation of stopping, when properly performed, is both preservation and cure." "*But*," he goes on to say, "*it must never be forgotten that this assertion is true only in those instances in which the operation is well and properly done; and perhaps it is imperfectly and improperly performed more frequently than any other operation on the teeth.*" And here the reputable practitioner has to strive against many annoyances. It is not unfrequent that he hears a charlatan eulogised for having filled up a tooth with some marvellous compound, without the slightest inconvenience, in an incredibly short time. And perhaps another who has had a similar operation performed by a practitioner of world-wide reputation and skill, will complain of an hour having been spent over it,—of bearing considerable inconvenience, and the operator censured with being

slow and rough in his operations. Now, the explanation is simply this:—The one takes the tooth as presented him, wipes it out, and plasters in some soft paste, and the patient is dismissed. The reputable Dentist, however, carefully removes every portion of softened bone, shapes the cavity to the necessary form to receive and retain the gold, smooths and makes circular the orifice, and proceeds to introduce the gold, every part of which is properly consolidated or welded before subsequent portions are added: the whole is lastly filed down and burnished. The object of a good stopping is to completely exclude air, moisture, and all extraneous matter, to preserve its colour and primitive figure, to arrest decay, and reinstate the tooth as an efficient masticating and articulating medium. In fact, a tooth properly stopped—i.e., in which these points have been effected—may be regarded as almost equal in value to an entirely sound organ. It need scarcely be explained that where soft bone is allowed to remain round the walls of the cavity, or sharp irregular edges of enamel to project from the orifice, it is impossible to obtain a perfect jointure. The moisture soon again in-



sinuates itself, and the soft bone readily absorbing and retaining it, decay proceeds, the stopping becomes loose, ultimately falls out,—and the tooth is left in a far worse state than before.

The cavity in a tooth produced by decay, is never in a state or shape suitable for the introduction of a good stopping, without previous preparation. The time it is necessary to spend on this stage varies considerably. Cavities existing on the grinding surfaces are easily and rapidly accomplished; those *between* the front and side teeth are the most difficult and tedious.

As a rule, gold only is admissible for the purpose of stopping, and in every case where practicable no other material, under any pretext whatever, should be employed. Exceptional cases occasionally occur, in which the ravages of decay have been so great, as to reduce the tooth to a mere shell, leaving nothing, or little else, but the frail walls. In such, gold would be injudicious. To consolidate gold-foil, or to weld crystal-gold, considerable pressure is required; this applied to the filling

of a tooth, the walls of which are in a frail and weakly condition, would be simply the means of breaking them down, and so making bad worse. In such cases, a good amalgam plug, placed in the tooth in a plastic state, when hard, well smoothed and burnished, will render a frail tooth, which must otherwise have fallen a victim to the forceps, serviceable for many years.

Of all the materials used in stopping, a badly condensed gold plug is one of the very worst; on the other hand, a *well*-executed gold plug, is, beyond all comparison, the best. If the tooth be frail, and the cavity situated in such a position that the approach is very difficult, preventing the operator from applying the pressure necessary to consolidate the gold, it remains in the tooth in a loose and porous state, rapidly absorbs the fluids of the mouth, and in every one of the several points necessary a well-conditioned plug should present, is the operator baffled, and the patient sent away labouring under a wholly fallacious idea of security. If the tooth be placed in the hands of an intelligent practitioner, no crotchets on the



part of the patient should be expressed to bias him; he will use what is best adapted to the case. What would be thought of a patient who went to his Physician for advice, and insisted on having *Quinine* prescribed him!

An idea of the importance of this operation when well executed, may be conceived from the following case:—A gentleman recently waited on us for the purpose of having constructed a new artificial upper case, in place of the old set he was wearing. He possessed but two natural teeth in the upper jaw,—a canine and half molar. The former had suffered from decay, but retained a beautiful gold plug, so well inserted, that a clasp of the old set had worn in it a burnished groove without having in the slightest degree affected its stability. On inquiring by whom the tooth had been stopped, he replied, it had not been done by his old dentist, —a gentleman much respected in the profession, and who, in his younger days, had been a skilful plugger of teeth; but latterly advanced years had deprived him of that patience and flexibility of hand, so imperative to a good operator. He had

been applied to, to stop the tooth in question which he did with gold; but in a few days, to his disappointment, it fell out. It was replaced but with the same result. The third time he was told it was too far gone to hold a gold plug, so it was filled with an amalgam. This remained in no longer than the gold; and on the fourth visit the old gentleman told him, it was useless to trouble further about it, it was evidently past stopping, that he had better cut it off, and arrange a new tooth to his artificial set. To this he refused to accede, remarking that the tooth was firm and painless, and that, as he then possessed but two he was chary over them, and would spare no trouble to save it. He then, very unwillingly, sought the aid of a Dentist (now deceased) who had a reputation for his gold plugs: it was stopped by him, and the result was the tooth as described. Many years had passed, and it still possessed, and is likely to possess, a value which, under the circumstances, it is impossible sufficiently to estimate.

When decay is detected in the teeth in its earliest stage, whilst yet entirely superficial, stop-



ping may be often dispensed with by the use of the file. This instrument, where applicable, is productive of a more desirable result than stopping; but it must be remembered that it can only be resorted to in the most incipient decay, and even then must be employed with the greatest discretion. The very frail and delicate classes of teeth will not bear it without considerable risk; and where not contra-indicated, unless used effectually, and the surface afterwards well smoothed and polished, it were far better left alone.

It is a matter much to be regretted, that so many will allow the most evident decay to proceed without seeking aid until it has reached the nerve, and produced a violent paroxysm of toothache. Stopping is then eagerly sought, and then in the majority of cases it is too late. It is true many teeth are saved which have been productive of much suffering, but as a rule, if the nerve be exposed, it is too late, at any rate, for a good and perfect gold plug to be inserted painlessly, and with certainty of success. But as a cavity will exist, after the breaking in of the

enamel, many weeks and sometimes many months before any pain is felt, ample time and warning are given to seek its preservation. When decay attacks the front teeth at their approximation but more particularly between the molars, it is often so insidious and obscure, as to give no evidence of its presence until a dull gnawing pain, or, what is more frequent, the lodgement of fibre of meat and other food, indicates something wrong. When it has become apparent or suspected, no time should be lost. "Don't wait," to use the quaint expression of an old Dentist, "till it has got to the nerve, any more than you would for a disease in the head, to lay bare the brain before you seek advice." By timely aid, a good stopping, with no pain whatever, and but trifling inconvenience, may be effected; whereas, by delay, the operation becomes painful, and the ultimate result rendered extremely critical.

We will now pass on to add a few words to those whom the foregoing will personally concern but little—those beyond the aid of conservative treatment, who have had recourse to artificial



substitutes, or contemplate recourse thereto. It were useless to expatiate on the value of a well-constructed case—it is sufficiently patent to the world—but will merely make a few remarks on a comparatively new material, which has now been sufficiently tested to be spoken of with confidence. The substance called "Vulcanite" has of late received a considerable share of attention, and not without merit. It has, however, like every other material or method employed in Dentistry, its advantages and disadvantages. Cases there are in which its excellences stand pre-eminently forward, others in which it is wholly inapplicable, or ridiculously inferior to gold. In upper cases in which the bite is close, and where strength, lightness, with as little possible bulk is indicated, gold is without its equal; but where there has been much absorption of the gums, and which is so frequently the case in lower dentures, the vulcanite is of great service. Where ivory sets have been previously worn—more particularly entire lower cases—it is of much value. Such sets possess all the comfort of ivory, without the great disadvantage of becoming softened and discoloured by the action of the fluids of the mouth.

No method, principle, or material has yet been introduced into practice, which has not been found to possess defects as well as merits; in one case it may be all that could be desired, in the next fall miserably short. As no single medicine--save the charlatan's nostrum—has yet been found efficient for all diseases, so no one method can be advantageously employed in every case that comes under the Dentist's care. It is for the reputable practitioner to take, sift, and estimate the intrinsic worth of every invention or novelty put forth bearing the semblance of value, and to apply its particular excellences to the peculiarities of each case. By this only can the Dentist receive credit and the public, advantage; and by this alone will an invention ascend or descend to its proper level, as its merits shall have been foolishly exaggerated or modestly claimed.

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ON THE

# CURE OF STRABISMUS.

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*(From the Edinburgh Med. and Surg. Journal, No. 147.)*

It is now upwards of five months since I forwarded to the editor of the Lancet* an account of three cases, where the division of the internal rectus of the inverted eye failed in removing its squint. In these cases, the inversion was slightly diminished, but still confined to the eye that had been operated upon, while the patient was directed to look at an object placed before him, both eyes being uncovered.

But, in the same paper, I stated that I drew the following inferences from the cases above alluded to:—

1*st*, "That the strabismus could not be regarded as confined to one eye, since, when the sound eye was closed, the affected

* Vide Lancet of September 19, 1840.

one became straight, and could move in any direction; but, on raising the lid of the former, it was found inverted, though the position of the eyes was soon reversed again."

2*d*, "That the straight position of the sound eye appeared to me to depend on the state of its optic nerve, as vision was much more distinct with it when the squinting eye was closed, than *vice versa*."

3*d*, "That the convergence was mutual, as was seen by the inversion of the sound eye, when (after closing it) the eyelid was quickly raised."

And 4*th*, "That the return of the sound eye to the centre of the axis of the orbit must be the result of a muscular effort, —an effort sufficient to overcome the contraction of its undivided adductor, and made to accommodate its more distinct vision."

On reading over the opinions of different writers up to that time, I found that the affection had been regarded as confined to, because apparent in the inverted eye; and that, in consequence of such cases being looked upon as those of single squint, the operation or operations had been practised on one or more muscles of the same eye.

Thus, in a paper written by W. R. Ancrum, Esq. (vide Lancet of July 18, 1840,) in a summary of seventy-six operations, Mr Liston is mentioned as having "partially or completely divided the inferior rectus in about ten cases," where the patient possessed the power of turning the eye a little inwards and downwards.

Again, in an appendix to his System of Practical Surgery, Professor Lizars, (page 4), mentions the necessity of adopting the same practice in inveterate strabismus of one eye, where the division of the adductor and of its contiguous fibro-cellular tissue has failed in removing the eye's power of inversion.

In a paper, dated September 1, (vide Lancet of September 12), Mr Duffin, in alluding to Mr Liston's practice, says, "he does not by any means call in question the fact, that in some few instances it may be necessary to divide the inferior rectus, though, in the same paper, he tells us that he has always found, on careful examination, that a few tendinous bands remained unseparated; and on dividing them, the patient could no longer carry the pupil beyond the centre of the orbit towards the nasal canthus.



In another paper, dated September 16, (vide Lancet of September 26, 1840), Mr Duffin says, "When the adductor muscle is cut across, and the eye liberated completely from any adventitious or other attachment that may still retain it in its unnatural position, the abductor muscle, if in a healthy condition, immediately draws the pupil to the visual centre of the orbit;" thus attributing the remaining inversion, if any exist, to an unhealthy state of that muscle.

Other surgeons have been satisfied with having removed the greater part of the deformity, by the division of the adductor, and preferred allowing a squint to remain, to dividing more muscles of the same orbit, and substituting an unsightly prominence for the original squint, (vide case of C. Culbert, by Mr Lucas, in the numbers of the Lancet for April 18, May 2, and July 4, 1840.)

At the 16th page of the fourth edition of the Report of the Royal Westminster Ophthalmic Hospital, by C. W. G. Guthrie, Junior, dated September 18th, the following remarks are made on the causes and treatment of the remaining inversion in such cases. He says, "In some rare and very obstinate cases, the eye, almost immediately after the division of the muscle, returns to nearly its pristine state of obliquity, and these are, I presume, the kind of cases in which it has been thought necessary to divide, or to attempt to divide other muscles than the one originally intended to be operated upon; and although the division and separation of the muscle and its attachments, in the manner I have especially indicated, in every direction, until the outer or sclerotic coat is fully exposed to a considerable extent, enables us to succeed, in most instances, in effecting the object in view, it does not always do so, and, in a few cases, I have been obliged to desist, without bringing the eye to an exact central position; or I have found it a little turned inwards or outwards on the next, or some other succeeding morning. The remedy for the evil is to exercise the eye in a regular manner."

Mr Guthrie then says, "The cause of the difficulty I believe to be twofold. It may occur when the incision in the conjunctival membrane unites, in the first instance, by adhesion, which it will do in some cases when it is small, and the eye by turning at all towards its former oblique state, facilitates this process. I suspect, also, that the ball of the eye rests in its peculiar bed of membrane and fat, like a cast in a mould; and that when the eye is liberated from its squinting state, it does not remain in its new and partially unsupported condition, but gradually falls back into the mould of fat and membrane origi-

nally formed around it. I am led to apprehend, that the conjunctival membrane materially assists, from its general attachment to the eyelids, in maintaining the eye in its old position, from which it is, however, gradually drawn, in these cases, by the efforts of nature, assisted by art."

In a letter recently addressed to the Academy of Sciences, (vide Lancet of July 11, 1840), Mons. Guerin states, that the results of his operations "have been advantageous, but not immediately so. In one case only did the eye become quite straight soon after the operation; in the others, there was merely an amelioration, and this circumstance appears to me to be a natural consequence of the true origin of squinting."

The operation was mentioned in a late number of the Provincial Medical and Surgical Journal, as being equally unsuccessful in the hands of MM. Roux and Velpeau of Paris, who, however, did not recommend any plan for the removal of the remaining deformity, but regarded the operation as one that would shortly fall into disuse.

The opinions first advanced by myself, as will be seen on referring to the inferences quoted at the beginning of this paper, were, that in cases where there was an association in the movements of the eyes, the affection could not be regarded as confined to one eye; and that the circumstance of the same eye still continuing inverted, after the division of its adductor, simply depended on two things, viz. 1*st*, The mutual convergence not being removed; in other words, the parallelism of the optic axes not being restored; and 2*d*, The effort made by its superior and inferior recti to invert the eye already operated on, in order to accommodate the more distinct vision of the other or sound eye.

The practice of dividing the corresponding muscle of the straight or sound eye, as it is generally termed, (adopted in the month of August 1840), was undertaken in order to remove the remaining mutual convergence, and restore the parallelism of the eyes; and its satisfactory result was mentioned in the particulars of two cases given in the same paper, when the inversion was still confined to the eye that was first operated on.

It was adopted in preference to the division of the superior or inferior rectus, which, though it might restore the parallelism of the eyes, and remove the squint, would leave a prominence of the eye that was operated on, and limit its future movements; and in preference to the "exercising of the eye in a regular manner," which, though it might succeed in some instances, after a practice of weeks, or even months, in rendering the first eye the straight one, by improving its vision, would fail in restoring the parallelism of the eyes, and only



change the inversion from the one eye to the other, and never succeed even in that, in cases where the vision of the first eye could not be improved to the necessary degree by its change of position.

The best definition of strabismus that occurs to me is—that state of the eyes in which parallelism of the axes of the globes, in their different movements, no longer exists.*

Strabismus, as thus defined, may be conveniently divided, for practical purposes, into two great classes, viz. 1. Those cases in which there is no association whatever in the motions of the two eyes; or which only can be properly called cases of single squint; and, 2. Those cases in which there is an association in the motions of the eyes, where the position of one eye is always dependent on that of the other, and which may, with equal propriety, be called cases of double or mutual squint.

1st Class. Cases of strabismus in which there is no association in the motions of the eyes, or cases of single squint.

The affected eye may be either fixedly inverted or everted. No change of position takes place in it on closing the other eye, or on directing the patient to look to one side or the other, when both eyes are open. In this class there is inversion or eversion of one eye, but no mutual convergence or divergence; and the deformity may be caused either by paralysis of the opposite muscle, or morbid adhesions.

In my own practice I have only met with one example of this class, which I shall briefly give.

John Williamson, aged 14; squint of ten years duration; cause, an injury of the head. On looking at an object placed before him, the position of the left eye was natural, while the inversion of the right was so great as to conceal the inner margin of the cornea. (Vide Plate I. Fig. 1. *a.*)

On closing the left eye by an effort, he could just expose the right cornea, which was drawn at the same time a little upwards or downwards, but not horizontally outwards. On looking to the right side, both eyes were much inverted. (Vide Fig. 1, *b.*) On looking to the left side, the eyes were parallel. (Vide. Fig. 1, *c.*)

At the urgent request of the patient, I divided, on September 8, the right adductor, though I gave him little hope of improvement. The result was a slight increase of power in moving the eye upwards and outwards, and downwards and out-

* In a practical treatise of this kind, it would be out of place to enter into a history of the causes of such loss of parallelism; nor is it my intention to take any notice of the temporary forms of it, incident to childhood, which may be removed without having recourse to operation.

wards. In a few days I tried the effects of electricity, through the medium of an acupuncture needle, introduced into the paralysed abductor, but without any apparent benefit.

In cases of this kind, it is scarcely necessary to say, that the operation, if undertaken, must be confined to the affected eye.

2D CLASS. Cases of strabismus in which there is an association in the movements of the eyes, where the position of one eye is always dependent on that of the other, and which may, with equal propriety, be called cases of double or mutual squint.

The two varieties of this class may be distinguished into,

1. Mutual Convergent Strabismus; and 2. Mutual Divergent Strabismus.

1st VARIETY.—*Mutual Convergent Strabismus. a. Cases requiring the Division of one Adductor; and b. Cases requiring the Division of both Adductors.*

*a. Cases of Mutual Convergent Strabismus requiring the Division of one Adductor.*—That these are not cases of single inversion, but in reality of double or mutual convergence, is proved at once by the experiment of closing the straight or sound eye, as it is generally termed, when the position of the eyes instantly becomes reversed.*

The affection, though slight, is undoubtedly participated in by both; and the effect of the operation on one eye, by removing the mutual convergence and restoring the parallelism, is visible on both eyes, since it not only removes the inversion of the eye whose adductor has been divided, but also the temporary inversion of the other or straight eye, which I have always seen in cases of this class, on resorting to the experiment of closing it and raising its lid, before the operation, as abovementioned.

Whether the parallelism of the eyes will be restored by the division of one adductor, may be nearly always ascertained before-hand, by attending to the following circumstances.

1. If the mutual convergence be slight, as seen by a corresponding slight inversion of one eye, when the patient regards an object placed before him, both eyes being open.

2. If the power of abduction be free, which I believe is always the case where the inversion is principally caused by the adductor, and not much shared in by the superior and inferior recti.

* There are a few exceptions to this rule, viz. where the centre of the retina of the inverted eye is not the most sensible part. These will be described afterwards.



3. If the eyeball be large, as in that case it will be less acted on by the inner fibres of the superior and inferior recti, unless their tendons be large in a corresponding degree, so as to wrap over to the inner side of the ball, which I have not observed to be the case; and,

4. If the patient be young, or the squint of short duration, which diminish the probability of any great implication of the inner fibres of the superior and inferior recti.

There can be no doubt, that the parallelism of the eyes would be restored in these cases by the division of the adductor of either eye; but a preference must be given to that of the inverted or less clearly seeing eye, for the following reasons. Suppose the left eye to be usually inverted, or not used, on account of its indistinct vision. The section of the right adductor would, by restoring the parallelism of the eyes, remove the inversion of the left eye, and no squint would be perceptible on desiring the patient to look at an object placed before him; but the movements of the eyes, on looking to the right side, would be too free; while, on looking to the left side, on the contrary, the eversion of the left eye and inversion of the right would be limited in a corresponding degree, from the circumstance of the inner fibres of the superior and inferior recti of the former having been probably in some degree implicated or practised in the production of the almost constant inversion of that eye, so as to counteract more or less the abductor's action; and the same fibres of the other or right eye would probably offer but a feeble opposition to the right abductor, as the actions of the different muscles of that eye may be presumed to be normal, in consequence of its natural movements when both eyes are open, and it is made use of.

In cases, however, of this kind, where the sight of the eyes is equally distinct, and where, consequently, they are made use of alternately, the operation on either eye will answer equally well.

CASE I.—September 13. Elizabeth Dixon, aged 19. Inversion of the left eye since her birth; position and motions of each eye natural, when the opposite one is closed. When the left eye is straight, the right is seen inverted on raising its lid suddenly. When both eyes are open, and the patient looks before her, the inversion is always seen in the left. Its vision is indistinct; eyeballs large. A peculiar rotatory motion is constantly seen in both eyes, probably caused by an irregular action of the two oblique muscles.

*Operation.*—The patient being seated on a chair, a table-cloth was passed round her arms and body, and secured behind

its back. Her head was allowed to lean against the breast of an assistant, who at the same time raised the left upper eyelid by means of a speculum, the right eye having been previously bandaged. The patient was then desired to evert the eye as much as possible, the lower eyelid being at the same time depressed by the forefinger of my left hand. One blade of a pair of small curved eye-scissors was then passed through the conjunctiva, about three lines internal to the cornea, and a little below the inferior border of the adductor, and pushed gently upwards between the conjunctiva and sclerotic to the extent of four or five lines, when the former was divided. A blunt hook was next passed through the wound of the conjunctiva, its point being directed from below upwards between the tendon and the ball. A second blunt hook being introduced was pushed from before backwards, so as to separate completely the muscle from the ball, the first hook serving to steady the eye. On withdrawing the second hook, the tendon was brought gently forwards into view by means of the other, and divided by a pair of common angular scissors.

*Result.*—On removing the bandage, the eyes were observed to be quite parallel, though for a few seconds the left one appeared to be slightly everted.

There was a temporary relapse, which soon disappeared, and the eyes are now (February) quite parallel. The rotatory motion round the axis of the balls has also disappeared.

*Remarks.*—The mode of operating, as above described, was adopted in all my cases. By keeping the convexity of the curved scissors towards the cornea, and point consequently from it, the risk of injuring the ball is much lessened. I have never found it requisite to raise the conjunctiva by means of forceps or hooks, previous to making the necessary incision. By dividing that membrane near the cornea, the protrusion of cellular tissue is avoided, as well as the flow of a few drops of blood, which seldom appear till the tendon is cut through, thus enabling the operator to see clearly the different steps of the operation. Another advantage is the absence of all chance of permanently injuring the appearance of the *caruncula* and *plica semilunaris.* In some few cases it was found necessary to make use of a sharp hook, inserted into the sclerotic, to evert the eye to the necessary degree. Considerable difficulty is occasionally experienced, in consequence of the violent spasmodic contraction of the orbicularis, which forces the lining membrane of the upper eyelid downwards, and of the lower one upwards, so as completely to cover the eyeballs, in spite of all attempts to bring it into view by raising the former and depressing the



latter. With a little patience, however, and perseverance, this difficulty has been always overcome. In operating upon children, it is advisable to secure the legs and feet to the chair; and in case the eye be forcibly inverted, so as to conceal the white, it may be drawn outwards by inserting the sharp hook into the sclerotic external to the cornea.

The operation, as thus described, I have frequently performed in fifteen seconds; but it sometimes happens that the whole of the tendon is not raised on the blunt hook. In such cases, the hook must be reintroduced, and a careful search instituted, sweeping from below upwards, over the posterior and inner surface of the ball, and then drawing it forwards, and cutting through any slip of the tendon, or cellular tissue previously undivided.

If the patient is unable to invert the eye beyond the centre of the orbit, the operation is complete as regards that eye; and this has been mentioned by different authors as the only test of the operation having been perfectly performed. In the great majority of cases, I have found, however, that the eye could be inverted considerably beyond that point, but not so as to conceal all the white of the eye, or the inner margin of the cornea, though the complete division of the tendon and cellular tissue connecting the muscle to the ball was proved in some of these cases by the clean exposure of the inner surface of the globe, and in all by a careful search with the blunt hook.

Case II.—Sept. 14. Miss Huggins, aged 19. Strabismus congenital. On looking at an object placed before her, the left eye was inverted, and the right central or straight. On closing the latter, their position was reversed, as was seen by raising its lid. Power of abducting the left perfect; eyeballs large.

*Operation.*—The left adductor was separated and divided as described in the last case, and the cure was instant and perfect, both eyes being straight.

*Remarks.*—The patient, who was deaf and dumb, was made to evert the eye by signs. There was not the slightest appearance of blood till the tendon was divided. The power of inverting the eye after the operation was considerable. It is now five months since the operation was performed, and there has never been the slightest relapse.

Case III.—Sept. 24. Robert Forster, aged 17. Squinted for eight years. On regarding objects in front of him, the right eye was always inverted, and the left straight. On closing the latter, their position was reversed, the left being seen for an

instant inverted on suddenly raising its lid. Abduction of the right free, its cornea nebulous, and vision indistinct.—(Vide Pl. I. Fig. 2. *a.*)

*Operation.*—On dividing the right adductor, the eyes were instantly made parallel (Fig. 2. *b.*) on looking forwards.

*Remarks.*—On looking to the right side, the left cornea was partly concealed, and a slight convergence was produced, (Fig 2. *c.*) On looking to the left side, a slight divergence was apparent, from the incomplete power of inversion of the right eye. (Fig. 2. *d.*) The patient was directed to practise looking to the left side, to prevent any recurrence of the mutual convergence, till the eyes were accustomed to their new association of movements. The cure is still perfect.

Case IV.—Sept. 29. Miss W., aged 23. On looking at objects placed before her, the right eye is straight, and the left much inverted. When the right is closed, their position is instantly reversed, as seen by raising its lid. Perfect power of abduction of the left eye, but its vision very indistinct; eyeballs larger.

*Operation.*—The left adductor was separated and divided, and the eyes were instantly made parallel on looking forwards.

*Remarks.*—In three weeks there was a relapse, or renewal of the mutual convergence, and inversion of the left eye; but by practising looking to the right side, the squint has disappeared. In order to render the cure permanent, the patient is directed to bandage the right eye occasionally, so as to improve the vision of the left to the necessary degree.

The next case, and last of the kind which I shall give, is particularly interesting.

Case V.—Oct. 10. James Wilson, aged 16. Strabismus congenital; small part of the white of the inverted eye seen internal to the cornea when the opposite eye is straight. One eye always inverted on looking forwards, but not always the same eye, as they are used alternately; vision of the right eye rather more distinct, though good in both. The inversion is often equally divided, when looking at objects very near the face. Power of abduction of both eyes perfect.—(Vide Plate I. Fig. 3. *a* and *b.*)

*Operation.*—The left adductor was separated and divided, and perfect parallelism instantly restored. (Fig. 3. *c.*)

*Remarks.*—This case would have been called one of double squint by the most careless observer. The patient made use of the eyes alternately; and the only reason for selecting the left eye for operation was the slight difference of distinctness of vision. The motions of both eyes were free, and the alternate inversion was completely removed by the operation upon one eye.



The preceding cases will serve sufficiently well to illustrate this class, which, though single as regards the operation, are in reality cases of mutual convergence, as is proved both by the dependence of one eye on the other as to the position before the operation, and by the effect of the division of one adductor, not only on its own eye, but also on the other which is no longer inverted, when its lid is closed and raised.

The only difference between these cases, and those to be next described, is in the degree of convergence, which, if great, will require the division of the second principal converging muscle, or the adductor of the other eye, whether that convergence be indicated by a continued inversion of the same eye after the division of its adductor, or the inversion be apparent in the second or formerly straight eye.

Before entering into a description of the next variety, however, it may be as well to mention the causes of relapses in such as have been described, and the practice to be adopted for its removal.

If an occasional inversion of the less clearly sighted eye be seen on desiring the patient to regard an object placed before him, and if it be removed by closing the other eye, which in its turn does not become inverted, as seen by raising its lid, the fault must be attributed to the indistinct vision of the former eye, in consequence of which an effort is made by its superior and inferior recti to prevent its interference with the clear-sighted eye, and to avoid the confusion that would otherwise arise from regarding objects with eyes whose powers of vision were different. In such cases, the eye, whose adductor has not been divided, must be bandaged; and the other eye must be regularly practised, till the sight of both be made to correspond, when the cure will be complete and permanent.

It often happens, however, that a recurrence of the old evil, or mutual convergence, takes place, as indicated by the change of position of the eyes, on closing the sound or clear-seeing one, which may be seen slightly inverted on raising its lid. The relapse is to be here attributed to the continued influence of the former association of the motor nerves, which causes an increased action of the remaining converging muscles; and is to be removed, not by bandaging either eye, which has no effect on the convergence, but only substitutes the inversion of one eye for that of the other, but by directing the patient to look to that side which will cause even a slight divergence, viz. to

the left side, if the right adductor has been divided, and *vice versa*.—(Vide Plate I. Fig. 2. *d*.)

The reason for this is obvious, as the power of inversion of one eye, after the division of its adductor, does not exist in a corresponding degree to that of eversion of the other; and the success of the practice is another strong proof of the proper distinction between single inversion, and mutual convergence indicated by inversion, as the plan just mentioned would be the most likely one possible to increase the original evil, were it really, as is too generally thought, confined to the inverted eye.

*b. Cases of Mutual Convergent Strabismus requiring the division of both adductors.*—In this division I include, 1*st*, those cases in which parallelism of the eyes is not perfectly restored by the division of the first adductor; and, 2*d*, those cases of relapse where the convergence cannot be removed by practice, whether it be apparent by a renewal of the inversion of the eye already operated on, or by a change of inversion from the first eye to the other, which inversion, as I have before mentioned, will be found to depend on the relative powers of vision of the eyes.

I shall first give a few examples where the inversion was removed from the eye whose adductor had been divided, and appeared in the other eye.

Case I.—October 10. John Batey, aged 22. Strabismus of seven or eight years' duration. Inversion of the right eye so great as to conceal the inner half of the cornea, when the left eye is central, or looking at an object placed before the patient. He occasionally uses the right eye, when the left one is as much inverted as the right generally is. The sight of the left eye is most distinct. Abduction of neither quite perfect.

*Operation.*—The right adductor was separated and divided, when that eye instantly became straight, and a slighter inversion appeared in the other or left eye. In a few minutes the left adductor was separated and divided, and parallelism on looking forwards perfectly restored.

*Remarks.*—The similarity between this case and that of James Wilson before described must strike every one. In both, the eyes were used alternately; the only difference being in the degree of mutual convergence, indicated by the different degrees of inversion.

The circumstance, in this case, of the inversion leaving the right eye and settling in the left, after the first operation, is accounted for by the tolerably distinct vision of the former, which prevented the necessity of any effort being made to accommodate the other eye.



Case II. October 13. Robert Wilson, aged 12½.—On looking at an object in front of him, the right eye was straight, and the left eye so much inverted as to conceal all the white internal to the cornea. When the right eye was closed, their position was reversed. The left eye could scarcely be everted beyond the centre of the orbit. Its vision was indistinct.

*Operation.*—The left adductor was separated and divided, and the remaining convergence was indicated by an inversion, sometimes of the right eye, at other times of the left.

The right adductor was then divided, and the cure made perfect. There has never been the slightest relapse.

*Remarks.*—The probability of a second operation being required, was indicated in this case by the limited power of abduction. The change of, or rather alternate inversion seen after the division of the first adductor, depended on the object looked at. If small, the right eye continued straight; if large, and such as could be seen distinctly by even the left, the right eye in its turn was inverted, as less effort was of course required for that position of the eyes.

Case III. October 13. Ann Smith, aged 9.—Squint of five years' duration. On looking at an object placed before her, one eye is always straight, and the other so much inverted as to conceal the white, internal to the cornea. The eyes are used alternately, though the right is most frequently so, as its vision is rather more distinct than that of the left.

*Operation.*—The left adductor was separated and divided, when that eye became straight, and the slightest possible inversion appeared in the other. The patient was directed to practise regularly as before explained; but the convergence, indicated by an increasing inversion of the right eye, continued to gain ground.

As the left eye was rendered rather prominent by the operation, the patient agreed to submit to the division of the second adductor, which was done on the 30th of October 1840. The instant the muscle was divided, the eyes were made perfectly parallel, and corresponded exactly in appearance. There has been no second relapse.

*Remarks.*—The relapse that supervened on the first operation could only be attributed to the influence of the ill-directed nervous association that regulated the motions of the eyes, and caused an increased action in the remaining converging muscles, and inversion of the clearer-sighted eye.

Case IV. October 16. Mrs Liddell, aged 31.—Squinted since childhood. One eye always much inverted on looking forwards; generally the left one. When the right is straight,

the inner margin of the left cornea is concealed. Abduction of the latter nearly perfect.

*Operation.*—I separated and divided the left adductor, and the eye was still slightly inverted. On searching with the blunt hook, some fine cellular tissue was drawn forwards and divided. A slight inversion then appeared to settle in the right eye. The right adductor was then divided, and parallelism instantly restored; the eyes at the same time being rendered equally full. There has been no relapse; and the sight, as in all the previous cases, has been much improved.

Case V. October 19. Mrs Gaddes, aged 33.—Squint of twenty-nine years' duration. Alternate inversion of the eyes. Sight and size of pupils correspond. If the right eye was directed straight upon an object placed before the patient, two-thirds of the left cornea were buried in the inner canthus; and on directing the patient to close the eyes for an instant and re-open them, their position was exactly reversed. This experiment was frequently tried, and always with the same result. In short, no difference could be detected between the eyes, as they seemed to relieve each other by acting alternately. (Plate II. Fig. 1. *a* and *b*.) The eyeballs were large, and their powers of abduction nearly perfect.

*Operation.*—The right adductor was separated, and its tendon divided. The right eye was still occasionally inverted. On reintroducing the blunt hook, a slip of the tendon was found undivided, and cut through. The inversion, though in a much slighter degree than before the operation, was then seen to settle in the left eye. (Vide. Fig. 1, *c*. Plate II.) The left adductor was next separated and divided, and on uncovering the other eye, both were seen perfectly straight. There has never been the slightest relapse up to this time. (Fig. 1, *d*.)

*Remarks.*—This was the most beautiful case of mutual convergence and alternate inversion that I have seen. The effect of the division of the right adductor was seen, not only on its own eye, but also on the left one, as seen by its diminished inversion. That both adductors would require division was evident before the operation, from the very great alternate inversion, and the duration of the squint. And that no relapse would take place was rendered probable, 1*st*, from the facility of regarding objects with both eyes, as their vision was equally distinct; and, 2*dly*, from the difficulty that the superior and inferior recti would experience in causing that relapse, in obedience to the long-continued and ill directed association of the motor nerves, on account of the large size of the eyeballs, which, as before-mentioned, are little acted on by those muscles, unless their tendons are large in a corresponding degree, so as to wrap over to their inner sides.



Case VI. Oct. 26.—Mrs Mary Cullen, aged 40. Squint of thirty-eight years' duration; right eye generally inverted; the inner half of its cornea being concealed when the left is straight. Their position is reversed when the right is made use of. Abduction of each eye nearly perfect.

*Operation.*—Separated and divided the right adductor tendon, when a slight inversion appeared to settle in the left eye. The left adductor tendon was then merely divided, without detaching the muscle from the ball, for fear of producing eversion, and parallelism was perfectly restored. There has been no relapse.

These cases will be found in every respect the most satisfactory, as a relapse seldom supervenes; and when it does, is easily removed by practice.

The patient must be directed to practise looking to either side, if a slight tendency to convergence be apparent, till the eyes are accustomed to their new association of movements, or association of parallelism. By this side practice, a slight temporary divergence is even produced, which is caused, not, as has been stated, by an undue action of the abductor, but by the inability of the other eye to invert in proportion, from the division of its adductor. This, however, soon disappears, and the eyes correspond perfectly both in appearance and movements. On dividing the second adductor, I have occasionally seen a slight divergence produced, even on looking forwards; but this has always been removed in the course of a few days. The patient in such a case must be directed to look forwards at objects, and avoid side-practice.

Cases are recorded, and I know of two in this neighbourhood, where the divergence produced was great, and could not be removed by practice. In such circumstances the division of either abductor will answer equally well in restoring the parallelism. But where the divergence has been produced by the division of only one adductor, I should select the other eye for the division of the abductor, in order to render them equally prominent. I may mention, however, that such an unfortunate result has never taken place in my own practice, and I believe it may always be avoided by first merely dividing the tendon, if the convergence be slight, and then, in case it be not removed, by reintroducing the blunt hook, and separating the muscle from the ball to the necessary extent.

I shall now give a few examples of the last variety of cases belonging to this division, viz. those where a still continued convergence, after the division of the adductor of the inverted eye, is indicated by a continued inversion of the same eye.

This continued squint or inversion, which is still confined

to the eye whose adductor has been divided, when both eyes are uncovered, and the patient looking before him, has been attributed, (as will be seen by referring to the various quotations at the beginning of this paper,) to very different causes, such as an undue contraction of the inner fibres of the superior or inferior rectus, an unhealthy state of the external rectus or abductor, healing of the wound of the conjunctiva by first intention, the eyeball returning to its bed of membrane and fat, like a cast in a mould, an imperfect division of the adductor and its cellular tissue, &c. &c., and the practice adopted for its removal has varied according to the views entertained by those writers as to the reasons of the continued inclination inwards of the eye.

The remaining inversion is no doubt effected by the contraction of the inner fibres of the superior and inferior rectus; but, as I stated in the Lancet of September 19, this contraction is made to accommodate the more distinct vision of the other eye, and is not the result of a shortening of those fibres, as is at once proved by the reversed position of the eyes, when the straight or sound one is closed.

An unhealthy state of the abductor, contraction of the conjunctiva, &c. are also disproved by the same simple experiment.

The cause of the evil is the non-removal of the mutual convergence, the continuance of which is to be attributed to the ill-directed association of the motific nerves; and the continued inversion of the eye operated on, depends, as before stated, on its very indistinct vision, which renders it comparatively unfit for use.

Were the affection confined to the inverted eye, and the inclination inwards attributable merely to a temporary effort made by its superior and inferior recti to prevent confusion of vision, the practice of bandaging the sound or straight eye would be all that was required. But, as already mentioned, the only effect of that practice in these cases is reversing the position of the eyes, so that the utmost to be gained by its adoption would be a permanent change of inversion from one eye to the other by producing a change in their relative powers of vision.

I trust the distinction thus made between inversion and convergence will be clearly understood. The former depends on the eye's comparatively indistinct vision; the latter, on an abnormal association of the nerves of motion. That the fault lies in the nerves which regulate the movements of the muscles, and not in the muscles themselves, is evident, 1*st*, from the natural position of each eye when the opposite one is closed; and, 2*dly*, from the circumstance that a similar action is frequently adopted by the remaining muscles or superior and



inferior recti, causing a temporary relapse, to remove which a side-practice of longer or shorter time will be often found necessary, till the eyes be accustomed to their new association or parallelism of movements.

It is on account of the difficulty of removing the converging tendency that I now invariably adopt the practice of dividing the second adductor, when an inversion, however slight, is seen in either eye on looking forwards, after the division of the first adductor; not to mention the improvement in the appearance of the eyes by rendering them symmetrical.

Hoping that these remarks will render the principles sufficiently clear, on which the practice of dividing the corresponding muscle of the straight or sound eye, as it has been frequently termed, was founded,* I shall proceed to give a few examples in illustration, begging leave to refer the reader to my paper in the Lancet of September 19, for the particulars of the successful results of the same practice in the two first cases of the kind in which I had an opportunity of adopting it, in both of which there was a temporary relapse, which was completely removed by side-practice. In the second of these the relapse could only be attributed to the motor nerves, and not at all to the nerves of sight or confusion of vision, as the inverted eye was affected with nebula, which rendered it utterly useless. Both cases are permanently cured; at least it may be presumed so, as there has been no convergence for several months.

Case III.—Sept. 14. Miss Rennison, aged 13. Squint of seven years' duration. Inversion of the left eye so great, as nearly to conceal all the white internal to the cornea, when the right eye was straight, and the patient looking at an object placed before her. On closing the right eye, their position was reversed, but on raising its lid, the left eye instantly turned in again. Right eye always made use of, as the vision of the left was very indistinct; abduction good; eyeballs small.

*Operation.*—The left adductor was separated and divided. On uncovering the right eye, a slight inversion was still apparent in the left. On searching carefully with the blunt hook, it was found that all had been divided. The adductor of the right and straight eye was then divided, which completely removed the remaining inversion of the left one, and restored the parallelism, at the same time rendering them equally prominent.

* A practice that has been regarded by one writer as "too absurd to notice," (Vide paper by Mr Clay, in Lancet of January 2, 1841;) and as a novelty, when adopted in *strabismus divergens*, calculated to produce incurable convergent strabismus. (Vide paper by Mr Duffin, in Lancet of November 7, 1840).

*Remarks.*—The continued inversion of the left eye in this case evidently depended on its indistinct vision, as it was nearly useless. The operation on the second and straight eye was undertaken in order to remove the mutual convergence, by depriving the motor nerves of their converging power. The power of inversion of both eyes after the operation was nearly natural, which might have been expected from the small size of the eyeballs.

In a few days, there was a slight occasional inversion of the left eye, evidently made to prevent confusion of vision, as it was removed by closing the other eye, which did not become inverted in turn, as seen on raising its lid, when both eyes remained straight. By bandaging the right eye for two or three weeks, the vision of the left was much improved, and parallelism restored.

Case IV. September 20.—John Dixon, aged 6. Very great inversion, and indistinct vision of left eye. Position of the eyes reversed on closing the right or straight one. Abduction of both good. Eyeballs large.

*Operation.*—The left adductor was separated and divided. On uncovering the right eye, the left eye again turned in. A careful search with the blunt hook showed that all had been divided. On closing the right eye, and raising its lid, it was seen slightly inverted, though only for an instant.

As the continued inversion of the left eye was thus proved to be the result, not of a voluntary effort on the part of its muscles, but of the non-removal of the mutual convergence, the adductor of the right, and still straight eye was divided, without separating the muscle from the ball.

*Result.*—Both eyes were perfectly straight on looking forwards.

*Remarks.*—Both eyes required operation in this case, on account of the great converging power, indicated by the great inversion of the left eye. As the eyeballs were large, it is probable that the tendons of the superior and inferior recti were large in a corresponding degree. The case is an extremely beautiful one, and there has never been any renewal of the mutual convergence.

Case V.—September 27, (Vide Plate II. Fig. 2, *a.*)—Mr Irving, aged 34. Squint of twenty-eight years' duration. Inversion of the right eye so great as to conceal the inner half of its cornea, when the left is straight. Right eye never made use of, as its vision is very indistinct. On closing the left, the position of the eyes was instantly reversed.

*Operation.*—The right adductor was separated and divided. On uncovering the left eye, the right one was still as much inverted as to conceal all the white internal to the cornea. On searching with the blunt hook, the eyeball's inner surface was cleanly exposed.—(Vide Fig. 2, *b.*)



After a little persuasion, the patient submitted to the operation on the left eye, in which no squint could ever be detected, except on closing and reopening it, and then only for a second or two.

*Result.*—Perfect parallelism and removal of the great continued inversion of the right eye.—(Fig. 2, *c* and *d.*)

*Remarks.*—For three days, the eyes remained straight, but at the end of that time, the right eye became slightly inverted again. In consequence of the patient's being obliged to attend to his business, (that of a barber), he was unable to bandage the left eye, on account of the bad sight of the right, which rendered it useless. The necessity of looking almost constantly forwards tended also to increase the convergence and inversion of the right eye, which at length became so great as nearly to conceal all the white internal to the cornea when the left eye was straight.

The patient, though anxious to undergo another operation, was induced to practise looking to the right side whenever he had an opportunity, and the result has been highly advantageous. When he now looks to either side, the eyes are parallel; and on looking straight forwards, they are frequently perfectly natural, though an occasional inversion, or rather cast, is seen in the right eye. I have little doubt but that this cast even will ultimately disappear, as the time devoted to side-practice has been short, in consequence of his almost constant occupation, which tends much to increase or renew the deformity.

Case VI.—September 28th. Mary Scott, aged 22. Inversion of the right eye so great as to conceal the inner margin of the cornea when the left eye is straight. Sight of the right indistinct. On closing the left eye, and desiring her to look at an object placed before her with the right, the latter remained inverted, and looked sideways at it, as the part of the retina corresponding with the foramen of Soemmering was not made use of. On moving the object looked at towards the right side, the eye became straight or central, and on then raising the left lid, the usual position of the eyes was seen reversed for a few seconds.

*Operation.*—The right adductor was separated and divided, but a decided inversion still appeared in the same eye, and entirely confined to it when both eyes were open, and the patient looking at an object placed before her. That the muscle was completely detached from the ball was ascertained by

a careful search with the blunt hook. The adductor of the left and straight or sound eye was then divided, and the result was not only the removal of the inversion, but even the production of a slight eversion of the right eye.

*Remarks.*—The slight eversion appeared in the right or quondam inverted eye, as might have been expected from its indistinct vision, and showed the effect of the division of the left adductor in a remarkably distinct manner. Considerable difficulty has been experienced in this case in forming an association of parallelism in the different movements, as the eversion disappeared, and was followed by an inversion of the same eye. This has been overcome, however, by side-practice, as bandaging the left eye would have been worse than useless, on account of the insensibility of the centre of the right retina, and the constant inversion of that eye, on looking at an object placed before it. It is now upwards of four months since the operation, and on standing opposite the patient, and desiring her to look at you when both eyes are open, they are perfectly straight. On closing the left, the right eye instantly becomes inverted.

The parallelism is maintained in this case by the association of the nerves of motion, and not of sight, as the left eye alone is made use of when both are open.

Case VII.—October 10th. Joseph Colthwaite, aged 28. Left eye never used, and the inner half of its cornea concealed, when the right is straight, and the patient looking before him. On closing and reopening the right or straight eye, their position is seen reversed for a few seconds. Can abduct neither eye beyond the centre of the orbit. Vision of the left eye very indistinct.

*Operation.*—Separated and divided the left adductor. On uncovering the right eye, the left again turned in so much as to conceal the white, the right eye remaining perfectly straight. The right adductor was then separated and divided, and parallelism was restored as nearly as possible, though not perfectly.

*Remarks.*—In a few days, the cure was made quite perfect by side-practice, and there has been no relapse. The eyes now correspond both in appearance and powers of vision.

Case VIII.—Oct. 14. Mary Sheppard, aged 18. Squint of fifteen years' duration; inner third of the left cornea concealed when the right eye is straight, or the patient looking before her. On closing the right eye, their position is reversed, but on opening it, the left instantly turns in again. Vision of the left very indistinct. Power of abduction nearly perfect.





*Operation.*—The left adductor was separated and divided, but an inversion still remained in the same eye. A careful search with the blunt-hook proved the complete separation and division of the muscle and cellular tissue. The adductor of the right and straight eye was then divided, which completely removed the inversion of the left, and restored the parallelism.

*Remarks.*—A slight recurrence of the mutual convergence was soon removed by side-practice, and both eyes have since remained perfectly straight.

Case IX.—Oct. 22. Mr Gavin Gray, aged 23. Squint of eleven years. Inner margin of the right cornea concealed, when the patient looks before him, and the left eye is straight. Position reversed on closing the latter. Right eye never made use of, and its vision very indistinct; eyeballs large, and abduction of neither quite perfect.

*Operation.*—The right adductor was separated and divided, but the same eye still remained inverted. On searching with the blunt-hook, a little cellular tissue was taken up and divided. The inversion still continued. The adductor of the left and straight eye was then separated and divided, which restored the parallelism, and removed the inversion of the right eye, though the eyes appeared unduly prominent.

*Remarks.*—There has been no relapse. This is probably to be accounted for by the large size of the eyeballs, as the patient's business, that of a printer, was calculated to cause a recurrence of the mutual convergence. The cure is perfect, and appearance of the eyes quite natural. The vision of both also corresponds.

Case X.—Oct. 28. John Morgan, aged 20. Squint of eighteen years' duration. Inner margin of the right cornea concealed when the left is straight. Sight of right eye very indistinct. On closing the left eye, the right is not directed straight upon an object placed before it, but remains inverted. On moving the object to the right side, the eye becomes straight. By raising the lid of the other, their position is then seen to be reversed; abduction good; eyeballs very small.

*Operation.*—The right adductor was separated and divided, and the eyeball seen completely exposed. The same eye still continued so much inverted, as to conceal all its white internal to the cornea. The left adductor was then divided and separated, and parallelism restored, though occasionally a slight cast appeared in the right eye.

*Remarks.*—As was expected, much difficulty has been experienced in the cure of the relapse. The change of seat of sensibility of the right retina, and small size of the eyeballs, will

at once account for this; the former rendering the inverted position of that eye most favourable for its use; the latter accounting for the great converging power of the inner fibres of the superior and inferior recti, which could invert the eyes by turns in a natural degree, immediately after the operation.

A few days ago, on examining the case, I found both eyes straight, but on closing the left, the right turned in as formerly, showing the association to be merely that of motion, not of sight.

Case XI. — Nov. 29. Matthew Robinson, aged 27. Squinted since childhood. On looking before him, the inner margin of the left cornea is concealed, while the right eye is straight. On closing the latter, their position becomes reversed. Sight of the left eye very indistinct, and a white speck seen in the lens. Abduction good; eyeballs small.

*Operation.*—The left adductor was separated and divided, but the eye still turned in. A careful search was made with the blunt hook, but it was found that all had been divided.

The patient was then urged to have the same operation performed on the other eye, but this he resolutely refused to submit to, as nothing could induce him to believe that it was at all affected. I thought it better to leave the eye inverted, than divide more muscles of the same orbit, and increase the prominence, which already existed after the division of the first adductor, though the patient was willing to undergo more operations on the squinting eye.

Side-practice, of course, proved in this case insufficient to remove the mutual convergence, and the eye still continues inverted.

Case XII.—Dec. 2. Miss Jane Robinson, aged 21. Squint of sixteen years' duration. On looking at an object in front of her, the inner margin of the left cornea was concealed, while the right eye was straight. Position reversed on closing the latter. Power of abduction very imperfect; vision much impaired, as the left cornea is nebulous.

*Operation.*—The left adductor was separated and divided. The patient could then abduct the eye perfectly. On uncovering the right eye, the left again turned in. As in all the previous cases a careful search was made with the blunt hook, but all was found divided. The adductor of the straight eye was then divided, and the inversion of the left completely removed. The cure was perfect.

*Remarks.*—A slight relapse was removed in a few days by side-practice. In this case, as in a few others of the kind on which I have operated, viz. where the cornea of the inverted eye was affected with nebula, the vision of the good eye was



much improved. This can only be accounted for by the steadiness of its position, since it no longer requires any effort to prevent its inversion, the mutual convergence having been removed.

It would be useless to offer more examples of this variety of strabismus,—indeed, I fear they are already too numerous. But I wish to impress on the reader, 1. that the division of the adductor of the inverted eye very often fails in removing its squint; and 2. that its continued inversion may be removed instantly by a division of the corresponding muscle of the straight and clear-seeing eye, provided the convergence be mutual, as ascertained beforehand by their association of movements.

I am anxious to lay the more stress upon this, as I regret to learn that such eminent surgeons as MM. Roux and Velpeau regard the operation itself as unsatisfactory, and one that must soon be abandoned; an opinion entertained also by some surgeons of this country, who have operated on a number of cases, but confined their operation or operations to the inverted eye.

The continued inversion, as before-mentioned, depends on the eye's inutility for the purposes of vision; and the surgeon must direct his attention, not to the removal of that inversion by dividing more muscles of the same eye, but to the removal of the mutual convergence, in causing which the straight or non-squinting eye is equally implicated.

As the convergence, though not the inversion, is always shared by both eyes, so ought the operation to be, provided parallelism be not restored by the division of one adductor.

And in such cases, I would insist upon the division of both adductors at the same sitting, in order to remove the converging tendency as soon as possible, otherwise the habit assumed by the superior and inferior recti may be so powerful as to require operation on them also. *

In all the cases where I have divided both adductors at the same sitting, the squint has been removed. In most of them the eyes have been instantly made parallel on looking forwards, and equally so in a few weeks on looking to either side. In a few a slight divergence has been caused, accompanied by diplopia; but this has always disappeared in a few days. In two

* In one case only has the division of both adductors failed in removing the squint, and I can only attribute it to the habit acquired by the superior and inferior recti, as an interval of three weeks passed over before the second operation was had recourse to. A search was made at the same time to ascertain if the first adductor had formed a new attachment to the ball, but the latter was found quite clear. Though the person still squints, the effect of the division of the adductor of the straight eye was greater on the inverted one, than the division of its own adductor.

or three an occasional cast has been observed immediately after the division of both adductors, when an oscillation of the eye that was formerly inverted was seen, caused by the alternate action of the abductor, and superior and inferior recti, which soon disappeared when the eyes became accustomed to their new association.

Before proceeding to the description of *strabismus divergens*, I may mention that I have on several occasions, where the squint had been removed by the division of the first adductor, had recourse to the same operation on the second eye, in order to render them equally prominent, and make them correspond in appearance. The second operation in this case must be conducted with extreme care, so as merely to divide the tendon near its insertion, without separating its cellular attachments to the ball, for fear of producing eversion.

Class II. 2d Variety. *Mutual Divergent Strabismus.*—Like the last, mutual divergent strabismus may be classified under two heads, viz.—

*a. Cases requiring the division of one abductor. b. Cases requiring the division of both abductors.*

*a. Cases of Mutual Divergent Strabismus requiring the division of one abductor.*—Like the cases of mutual convergence, the closing of either eye makes the other straight; and on raising the lid of the closed one it will be seen everted.

When the mutual divergence is slight, as indicated either by the constant slight eversion of the same eye when the patient looks forwards with both eyes open, or by the alternate slight eversion of the eyes, when their powers of vision correspond or nearly so, the division of one abductor will be all that is required; and, for the reasons before given, I would select the usually everted eye, or that one whose vision is most indistinct, for operation.

Where, however, the eversion has resulted from the division of one adductor, and cannot be removed by practice, I would give a preference to the other or straight eye, in order to render them equally prominent.

If the eyes be made use of alternately, parallelism will be restored by the division of either abductor.

*b. Cases of Mutual Divergent Strabismus requiring the division of both abductors.*—The particulars of the first case of this kind that I operated upon (on October 6, 1840,) were given at sufficient length in the Lancet of October 31. The second case was alluded to in the same paper, and will serve to illustrate this class.

Case. October 10. Plate II. Fig. 3. *a.* Mr Wilson, aged 41.—Squint of thirty years' duration. On looking forwards,



the right eye is always straight, and the left so much everted as to expose scarcely a line of the albuginea external to the cornea. The eversion is always seen in the left eye, its vision being so indistinct as to render it useless. On closing the right eye the left becomes straight; and on raising the lid of the former, it is seen everted for an instant, when their position becomes reversed. Power of inversion good.

*Operation.*—The left abductor was separated and divided, and was found scarcely thicker than a crow-quill. A slight eversion was still apparent in the same eye. On searching with the blunt hook, it was found that all had been divided. (Fig. 3, *b.*) After a little explanation, the patient readily submitted to the second operation.

The abductor of the straight or sound eye was then divided, which, by removing the diverging power,* and restoring the parallelism, removed also the continued eversion of the left eye. (Fig. 3. *c.* and *d.*) The cure was perfect, and the power of abducting each eye existed in the natural degree, immediately after the operation.

*Remarks.*—In a few days the left eye again appeared slightly everted, and on closing and reopening the other, the affection was proved to be mutual. The patient was directed to practise looking forwards at very near and small objects. By this means, a slight temporary convergence was produced, which was soon removed by the patient's judicious management. The eyes have now been perfectly straight for upwards of three months, and the vision of both now corresponds.

The other cases of *strabismus divergens*, on which I have operated, resemble this one so closely that it would be merely a repetition to lay them before the reader. In all of them, the vision of the everted eye was very indistinct, and consequently the inclination outwards after the first operation was still confined to it; and in all, the division of the corresponding muscle of the straight eye restored the parallelism.

The relapse that takes place in these cases requires considerable practice to remove, and in one of my cases a slight cast outwards still remains, particularly on looking upwards.

In none of them has there been any granulation, and this may probably be attributed to the horizontal incision of the conjunctiva, which does not leave the sclerotic so much exposed, the excrescence appearing to shoot from its surface.

When a granulation appears, it may be touched, if small, with nitrate of silver. If it be large, however, I wait till the

* I make use of the word power, for the diverging tendency or influence of the motor nerves exists even during the parallelism obtained by the operation, and generally shows itself by causing a temporary relapse.

wound of the conjunctiva contracts around, and partly strangulates it. The narrow neck is then snipped through with a pair of scissors, close to the ball, and the bleeding surface touched with caustic, which is generally found sufficient to prevent its renewal.

In conclusion, I may be allowed to offer a few remarks on the classification generally adopted in cases of strabismus.

Mr Lucas (and in quoting his opinions I believe I lay before the reader those generally entertained) divides them into,

I. *Convergent*, II. *Divergent*, and III. *Anomalous*.—"Convergent strabismus," he tells us, "may affect one or both eyes;" and his mode of ascertaining it is by holding his hand obliquely in front of the straight or better-sighted eye, and "desiring the patient to exercise the other." If, when the usually inverted eye becomes straight, the other retreats into the inner canthus, the case is one of double convergent strabismus, and will require the division of both adductors; "but if the contrary occurs, if both eyes are at this period straight, or even if the covered one has but a slight inclination inwards, the case is one of single convergent strabismus, and the inner rectus of one eye only will require to be divided." (Vide p. 48 and 49 of Mr Lucas's treatise on Squinting.)

Now I may again mention, that in all the cases I have seen, where the eyes were free in their movements, whether requiring the division of one adductor or both, the convergence was mutual, and the only effect of closing or shading one eye was substituting its inversion for that of the other. The convergence was neither removed by it, nor the eyes made parallel.

If parallelism can be temporarily induced by covering the clear-sighted eye, it ought to be bandaged till the sight of both is made to correspond, when a permanent cure, without having had recourse to operation, would be the result. Such a case I have not yet seen, and it could only be termed one of single inversion, not single convergence.

In cases requiring the division of both adductors, the mutual convergence is also shared by both eyes, and differs only in degree from those requiring the division of one.

In these cases, for the reasons already given, the inversion may be always seen in the same eye, when both are open, though the convergence is always shared by both eyes.

I have never yet seen the division of both adductors, when it was found necessary, fail in removing the squint, if both operations were undertaken at the same sitting. The relapse that generally supervenes has been perfectly removed in nearly all these cases by side-practice; and where the vision of the eyes can be made to correspond, the cure will probably be perma-





nent, though a sufficient length of time has not yet elapsed to render it certain.

The occasional cast that is sometimes seen, weeks or even months after the operation, may be always, I believe, attributed to one of two causes, viz. either a continuance of the converging tendency, in consequence of the necessary degree of side-practice not having been resorted to with sufficient perseverance on the part of the patient, or the difficulty of making the sight of the eyes correspond.

In the former case, I believe the cure may be made complete by the patient's good management.

In the latter, the propriety of removing the occasional squint by further operation is questionable, as that object can only be gained by permanently destroying the eye's power of inversion, and consequently depriving both of their beautifully associated lateral movements.

The preceding remarks and cases will show that much requires to be done after the operation. The converging or diverging tendency, (according to the kind of strabismus,) that exists during the parallelism obtained by operation, shows its effects in most cases on the remaining muscles by causing a relapse; and close observation on the part of the surgeon, with well-directed and persevering practice on the part of the patient, will be found requisite in order to render the cure complete.

With attention to these, however, the operation will not only be found one of the most beautiful, but also one of the most successful that was ever introduced into surgery.

*Carlisle*, 1841.

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Fig. 1.

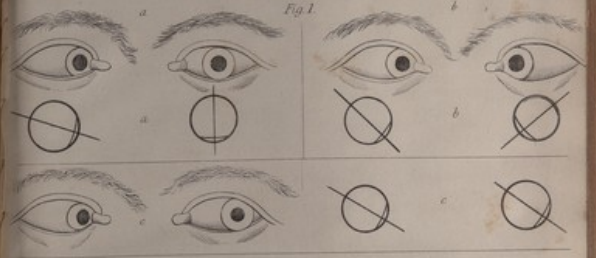


Fig. 2.

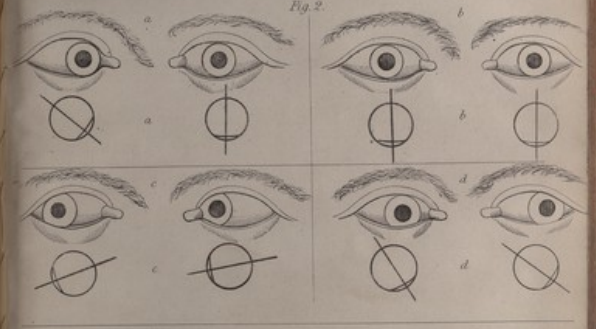
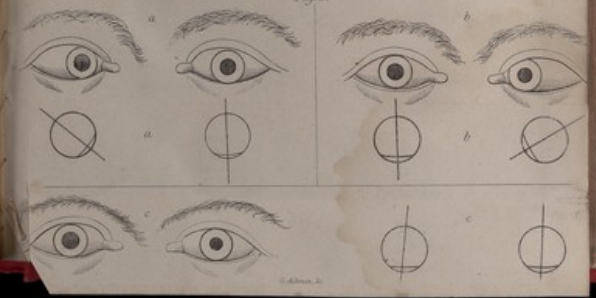


Fig. 3.



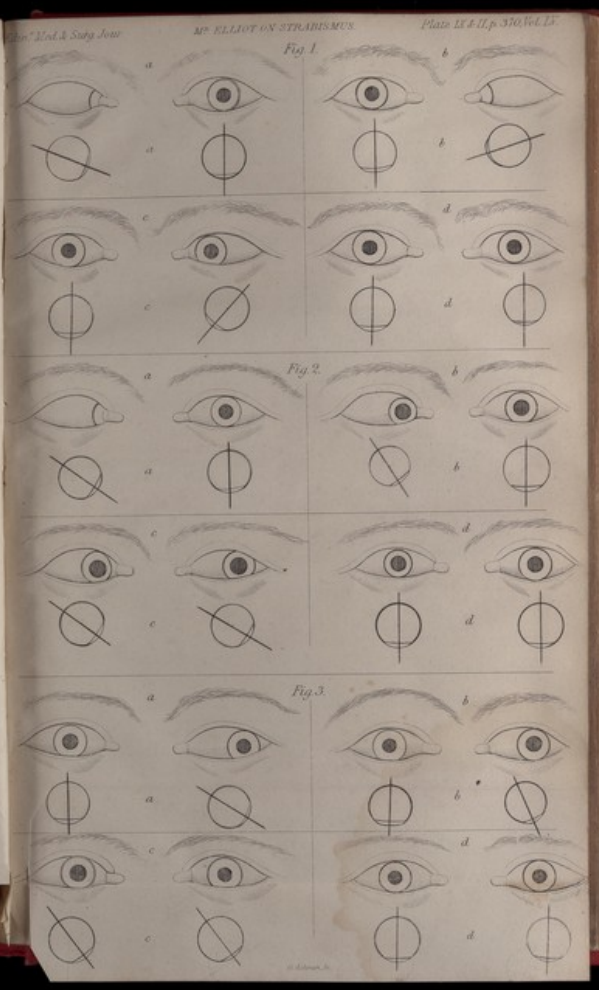


Fig. 1
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J. W. Fleming, Esq^r
with the Author's kind regards

# CASE

OF

# REMOVAL OF STONE FROM THE BLADDER

BY THE NEW OPERATION OF LITHECTASY OR CYSTECTASY,
WITH REMARKS.

By THOMAS ELLIOT, M. R. C. S. L.,
Carlisle.

*(From the Edinburgh Med. and Surg. Journal, No. 154.)*

The following case possesses some interest, from the circumstance of its being, so far as I am aware, the first on record of the adoption of the plan so ably advocated by Dr Willis of London in a recent publication,* and said to have been originally proposed by Mr John Douglas, and shortly afterwards (in 1819) suggested to the late Sir Astley Cooper by the Drs Arnott.

The successful removal of a calculus of considerable size on that occasion by Sir Astley, in the mode recommended by the Drs Arnott, who attended the case with him, could scarcely be regarded as a fair test of the merits of this operation, inasmuch as the patient had, nine months previously, undergone the operation of lithotomy, and a possibility existed of the cicatrix of the prostate having been torn open, if, indeed, that gland had ever entirely healed,—a fact more than doubtful, from the presence of a recto-urethral fistula, that had remained from the first operation, and might possibly traverse a portion of the gland.

* On the Treatment of Stone in the Bladder by Medical and Mechanical means. By R. Willis, M. D., of the Royal College of Physicians, Physician to the Royal Infirmary for Children, &c.

The operation, as performed by myself, deviated in some respects from the plan proposed by Dr Willis, as it appeared to me that any advantage that could be gained by external incisions so very limited as he recommends, would be much more than counterbalanced by the inconvenience that might possibly attend the introduction of the dilator, by the difficulty of securing any blood-vessel in case it were necessary, and by the additional resistance that would be offered to the process of dilatation, and to the subsequent removal of the calculus.

Case. Thomas Irving, aged 17, stone mason, first consulted me in the month of May 1842. His general health was good, though the inconvenience that arose from the presence of a stone in his bladder was increasing. He had, however, been able to attend to his employment until a fortnight before I saw him, and stated that he could walk, and even run, without suffering. The symptoms were not severe, but, as the medical treatment to which he had been previously subjected, had failed to remove the irritability of his bladder, he was anxious to submit to an operation for the removal of the stone, with which he believed he had been affected for four months.

Having observed a slight scaly eruption on the skin, and that the urine was of an acid nature, I subjected him to a course of simple alteratives, and gave him a weak solution of the carbonate of potash in considerable quantities. As the stone on sounding appeared to me, and to my medical friends, who on various occasions saw the patient, to be of small size, they at once agreed with me on the fitness of the case for a trial of the operation of lithectasy; and the patient, together with his father, willingly consented to its adoption, on its being explained that it was comparatively, if not entirely, free from danger.

I accordingly procured from Mr Weiss of London a dilator with stop-cock and syringe, as described by Dr Willis, and proceeded on 29th of July, after the exhibition of an enema and an opiate, to operate as follows, in the presence of Drs Jackson, Oliver, James, Atkinson, my brother Dr William Elliot, and pupil Mr Fleming.

*Operation.*—The grooved staff was introduced, and the stone felt and heard. The patient was then secured in the same position as for lithotomy, and the different steps were precisely the same as in that operation, until the prostate and membranous part of the urethra were exposed. The latter was opened close to the prostate, and divided cautiously towards the bulb, by carrying the knife along the groove of the staff, till an opening was made of sufficient size. The staff was then withdrawn, and the point of the forefinger of the left hand served as a guide for the introduction of the dilator, which, having been previously well greased,



was passed along without any difficulty. A little warm gum-mucilage was next slowly injected into the instrument, until the patient slightly complained of the feeling of distention. On removing him from the table to the bed he complained of a strong inclination to make water, which was found to arise from the dilating part of the instrument having slipped into the bladder. It was emptied, partially withdrawn, and, when fairly within the neck of the bladder, again distended. In this position it was secured by attaching a long tape to it, and around the patient's foot, which again was fastened to the bed post.

The patient did not complain above his breath during the operation, nor lose more than two or three drachms of blood. Another opiate was now administered.

In three hours time, a few teaspoonfuls of the mucilage were again thrown into the dilator until the patient complained. Urine had passed freely along that part of the tube which communicated with the bladder. He slept occasionally during the day, and the pulse was natural.

30th, at 8½ A. M. Going on well; thought the distention as much as he could bear.

At 1 P. M. Slight sympathetic tenderness over the whole of the abdomen; pulse 104, irritable; uneasy from the distention; pain of perineum on coughing; tongue clean and moist. Gave him an opiate, and sent word to my medical friends, who met me at 3 P. M. I then, in their presence, emptied the dilator, and withdrew it, at the same time passing my left forefinger along it into the bladder. I immediately felt the stone, which was of small size, and in shape resembled a coffee bean, being about four times its size. It was removed with the scoop and finger. The prostate was well dilated, and would have allowed the removal of a calculus of more than an inch in its shorter diameter. The uneasiness of the abdomen and perineum disappeared on the withdrawal of the dilator. A lithotomy tube was then left in the wound.

At 12, *med. nocte.* Urine had passed freely; pulse 96; tongue moist; no pain; had slept well. Ordered a dose of castor oil.

31st. Bowels not moved; had an enema; appetite good; says "he never felt better."

August 1. A M. Complained of slight uneasiness, which disappeared on the removal of the lithotomy tube; going on well. At 10 P. M. was able to retain his urine, and could expel it by the wound.

At midnight passed about half-a-cupful by the natural passage. He was directed to lie on his right side, to favour its passage along the urethra as much as possible.

2d to 11th. Going on well; bowels regular; tongue clean; no constitutional disturbance; urine escaped freely both by the natural passage and wound; deposit of mucus in it; no pain; each night had taken a composing draught.

12th. Had a rigor.

13th. Complained of pain along the left spermatic cord.

15th. Left testicle swollen.

20th. Unable to void his urine by the natural passage at all; *Ardor urinæ*, and *gonorrhœa præputialis*.

24th. There was a discharge of a teaspoonful, or two at the most, of dark brown fluid, partly by the urethra, and partly by the wound. None of it had been kept. We supposed it to have been from a small abscess in the neighbourhood of the bulb, from the circumstances of the rigor on the 12th, and of no urine having passed along the urethra since the 20th, though it had escaped freely by the wound.

For a few days he had laboured under constitutional disturbance of a slight description, and for the first time since the operation had not rested well at night. After the escape of purulent matter, however, on 24th, he rapidly improved, and was able to walk out before the end of the month, occasionally calling at the surgery, and at other places still more distant from his home. For a short while, a few drops of urine occasionally escaped by the perineum when he was making the last usual efforts to expel it, until the wound finally closed. He has followed his employment (which is now that of a pipe-maker) from the 3d or 4th of October, and has improved much in appearance, being considerably stouter than before the operation; and he says he would willingly submit to it again if afflicted with the same complaint.

I may mention that the patient was seen at different times by Dr Lonsdale of Edinburgh, and by Messrs Bowman, Kerr, and Linton of this city, besides those present at the operation.

*Remarks.*—1. It will always be advisable before hand to dilate the urethra and neck of the bladder as much as possible, by the introduction of bougies gradually increased in size, both to facilitate the passage of the dilator, and to accustom those parts to the presence of a foreign and irritating body.

2. Before operating, as well as during the process of distention, an opiate operates advantageously, by diminishing the sensibility, lessening any chance of shock, and relaxing the part.

3. The grooved staff should be large, and pressed against the perineum, not hooked against the pubis, as in lithotomy, care being of course taken to prevent its escape from the bladder.

4. The external incisions I would recommend to be free, since, if the prostate were unfit to undergo the process of dilatation, either from great rigidity, as is frequently found in old subjects,



or from morbid irritability,—the operation could be at once completed by converting it into lithotomy. It will be unnecessary to repeat the reasons before given, for the preference afforded to this plan of proceeding.

5. The form of the dilator sent to me by Mr Weiss might be improved by making it cylindrical, and not tapering towards each end. There would thus be no risk of its slipping from its position. The signs of its being properly placed are the feeling of distention and immobility. When it slips into the bladder, (as happened in this case, on removing the patient from the table,) the instrument can be pushed inwards towards the bladder, cannot be withdrawn, the tube is very moveable in all directions, and the patient experiences *tenesmus vesicæ*, without any feeling of distention. It would be better if the dilating part of the instrument was of sufficient length to appear in sight, as the operator would be not only certain of its position, but able also to judge of the degree of tension when injecting the fluid,—a much safer criterion than trusting to the feelings of the patient, who might possibly submit without complaint to a pressure that would prove injurious. The instrument would be also improved by attaching a small stop-cock to the urine tube, and another to the tube that communicates with the dilator, as that which screws into the syringe is apt to slip when left in the tube. If the piston of the syringe was graduated, and the dilator perfectly water-tight, the surgeon would be able to judge exactly of the degree of distention of the prostate by the quantity of the fluid injected; and this would at once enable him to remove the instrument as soon as the dilatation was complete.

6. The length of time requisite for dilating will, of course, vary according to the resistance of the prostate and degree of force used; but I would strongly urge its being done at intervals, for, say quarter of an hour at a time, as less likely to cause irritation than if continued for a period of 30 or 40 hours, as has been mentioned.

When the dilator was withdrawn in this case, two fingers could be introduced with the greatest ease along with the scoop.

The instrument, when fully distended, measures 4½ inches in circumference, and is about the size of a hen's egg; and a stone of the same dimensions might have been easily extracted.

Though twenty-five hours elapsed before the removal of the stone, it could have been as easily effected, and the dilation must have been as complete, at the end of the third hour, since no additional fluid was thrown in after that time. This period was allowed to elapse, as I certainly did not expect to meet with so little resistance, and be able to complete the operation in so short a time. The alterations in the length of the dilating part of the instrument which I suggested above, would have at once

prevented this, nor would it have happened, could I have been certain that none of the fluid had escaped where the stopcock is inserted into the tube, and by that means known that the distention was kept up.

Though impossible to form a correct estimate of the operation from one case, I would be inclined to give a decided preference to this plan over that of lithotomy.

The patient, from beginning to end, could never be said to be in danger, as any hemorrhage that might have taken place during the operation could have been easily controlled. The presence of the dilator effectually prevents any oozing, as well as the injurious contact of the urine with the raw wound. There was no chance of shock, no risk from peritonitis, infiltration of urine, inflammation of the veins of the neck of the bladder, nor any of the grave sequelæ that too often supervene on the operation of lithotomy. The only unfavourable circumstances that occurred during the progress of the case, were the formation of a trifling abscess, as previously mentioned, and the existence for a few weeks of a small fistula, which would barely admit a crow quill. The former would probably never have occurred, had not the pressure, as recommended, been uninterruptedly continued; and the latter, which healed up soon on his taking exercise and gaining strength, is of too frequent occurrence after lithotomy, to deserve more than a passing notice.

Difficulties, which have been already stated, may occur, viz. great irritability or rigidity of the prostate. In such cases no time has been lost, if the preliminary incisions for lithotomy have been resorted to, and the prostate may be at once partially divided, and the stone removed. But is this step advisable, or even justifiable where the dilator can be employed? I should say not. The loss of a few hours, for the purpose of dilating, is, of course, of no moment, if the danger to the patient is lessened, or even removed and whatever be the size of the stone, if the distention has been complete, it will be perfectly accessible to the most efficient crushing instruments, and its perfect and immediate removal rendered a matter of certainty.

This conclusion, which Dr Willis anticipated, is fully warranted by, and could have been realized in the preceding case; and his able advocacy of this operation, with his bold and judicious estimate of its merits, as compared with lithotomy and lithotrity, entitle him to the highest esteem of his professional brethren, and to the warmest gratitude of every sufferer whom the operation may relieve.

*Carlisle, November* 1842.

PRINTED BY JOHN STARK, OLD ASSEMBLY CLOSE, EDINBURGH.

ON

# Scientific Medicine,

AND

## ITS RELATIONS TO, AND CLAIMS UPON, SOCIETY AT LARGE:

BEING AN ADDRESS READ BEFORE THE PRESIDENT

AND OTHER MEMBERS

OF

**The North of England Medical Association,**

AT ITS SECOND GENERAL MEETING, HELD AT CARLISLE,

ON TUESDAY, 15TH SEPT., 1840:

BY WILLIAM ELLIOT, M.D., &c.

—

WITH AN APPENDIX.

—

PUBLISHED AT THE REQUEST OF THE SAID ASSOCIATION.

—

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## ADVERTISEMENT.

*The Council of the Association at whose request and expense the following Address is printed, having kindly committed to the Author's own superintendence the revision of the press, and other details of publication, he has taken upon himself slightly to alter the mere arrangement of certain passages, of an explanatory, illustrative, and particularizing character, besides adding a few references to, and full quotations from, other documents.*

*The form most convenient to adopt in the insertion of the two latter being that of Appendix, it seemed also advisable to place therein not a few of the former, leaving, of course, letters of reference in the places they originally occupied.*

Carlisle, Nov. 10, 1840.

To the J. M. Fleming with the best wishes of the Author.

# ON SCIENTIFIC MEDICINE, &c.

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## INTRODUCTION.

Of the address now submitted to your indulgent hearing, no one can regret more than its author the hasty preparation and consequent defects. Yet, whatever may be the imperfections of the Essay, he himself will not readily yield to any one in zeal for the general objects of this and similar associations,—nor in anxiety that the proceedings of the present meeting may prove agreeable to all who attend it, efficient in furthering the business of the Association, and, above all, conducive to our grand and rallying object, viz., the wholesome organization and consolidation of the medical profession, institutions, and laws, of this empire; and, by necessary sequence, the better assurance of the medical interests of its people.—Now, as this main object of our hopes and efforts is one of too vast importance, both to the medical profession and to the public at large, to require any apology for its introduction on this occasion, it needs only to be further premised, that in the present Essay will be offered a few remarks on the three following heads:—

1. On the characters, operation, and claims of regular and scientific medicine, as contrasted with those of an irregular or unscientific profession of the Art.
2. On the actual condition of the authorized medical profession in these realms, in reference to its internal regulations and constitution,—to the operation of statute laws,—and to the invasions of irregular practitioners connived at by government.
3. On the justice, public expediency, and necessity, of conferring on the medical profession a *well defined* and wholesome constitution, an effective legal recognition, and unassailable privileges.

## I. On the characters, operation, and claims of regular or scientific medicine, as contrasted with those of an irregular or unscientific profession of the Art.

The profession of medicine includes both a *Science* and an *Art*, the mutual relations of which, in a general sense, are thus expressed by Professor Whewell:—"Art and Science differ.—The object of Science is knowledge: the objects of Art are works. In Art, truth is a means to an end; in Science, it is the only end."

Medicine has various phases, relations, and applications, of which the chief are the *preventive*, and the *remedial*, operating either *personally*, or on *numbers*. Hence we have what we may style,

1. Personal preventive (or prophylactic) medicine;
2. Social prophylactics, embracing the comprehensive, all-important, and, in this country, much neglected subject, of public hygiène;
3. Remedial medicine applied personally; and
4. Remedial measures influencing a community.

Now he only who has been at pains to acquire the *science* is at all competent to undertake the *practice* of medicine in all or in any of its phases; and such an one, duly attested by adequate examination, constitutes a scientific and regular practitioner of the same. On the other hand he

who, for the sake of gain, attempts its practice without any, or at least an adequate, acquaintance with the science, or, whether ignorant of medical science, or well versed in it, neglects its appliances, and uses one exclusive remedy or method, or, habitually, uses any or all methods at random, is, *in whatever class of men he may be nominally ranked*, an unscientific, an irregular practitioner. Such an one is often designated by other titles, as empiric, quack, and so forth. (A)

The word "Empiric," originally Greek, signifies simply *an experimentalist*, one who tries, and is guided by the results of, personal experiments, (rather than of ordinary experience as usually stated); and seems all along to have been applied exclusively in a *medical* sense, to one, moreover, whose object was, upon that basis, to undertake the *practice* of medicine, probably for the most part in old times, as without exception in modern, for fee and reward.

In the dawn of medical science, such a character, whether viewed as a passive, yet faithful and profiting observer of facts, or as an active and reasoning experimenter, was entitled to the appellation of a medical philosopher. And, accordingly, we find that the so called sect of "Empirics," in former ages, included many eminent men and fathers of medicine, (amongst others, Asclepiades and his admirer and follower Celsus). Further, we find that in every age the medical philosopher whose more accurate and minute observations, whose more faithful records, more sound inductions, and more rational and successful practice, than those of his predecessors, constituted him a real improver of the science, was



in reality a *rational empiric*, some of whose observations and conclusions perchance maintain their ground even in our day. (B)

On the other hand, men whose observations were either limited or ill connected, palmed crude and ill based dogmas on the world, which were gradually dissipated by the slowly concentrated rays of demonstrable truth. (C)

It is thus evident that the value of the term "Empiric" is relative, and is determined by the advancement of the age, or rather of the science, in connection with which it is used.

It has been well observed that in many departments of medical science we are, in the present day, in the possession of more facts and observations than we have, as yet, been able to arrange properly, so as to use effectually for medical induction and generalization. Consequently, of the worthy Empiric, as known of old, it may be truly said that his "occupation's gone," just because his difficulties are gone, and his desiderata supplied, certainly not, as yet, by the construction of a *complete* science, but by the large accumulation, the progressive arrangement, and the already most fruitful theoretical results of the scientific gleanings of a world of enquirers that have preceded him. Before observing for himself, the medical enquirer of our day has to learn, in the aggregate, the experience of all the most experienced, the observations of the most acute, the conceptions of the most ingenious, and the generalizations of the most powerful and comprehensive minds. Before observing for himself, he must climb to the highest step attained by his predecessors, and must *submit* shall we say? nay

rather, in grateful and ardent recognition of a glorious privilege in the modern career of mental discipline, must *aspire* to enjoy the ingress, and appropriate the substance, of those bright revelations which it is imparted to men of genius to convey to their fellow-men. He must thus, even in his very pupilage, become familiar with such varied and extensive stores of useful knowledge, rich ideas, and confirmed theories and rules of practice, as a thousand years of patient observation and reflection might have failed to supply or suggest to himself; albeit that, when submitted to the mind of one man as the views of another of more favoured opportunities, or of loftier powers,—they are by the former generally at once apprehended, and incorporated into itself. This appropriation of mental treasure is, for the most part, accomplished with facility, and with that peculiar delight experienced by every student of nature, when permitted, either through the medium of his own unaided faculties, or of the interpretation of a Newton, a Herschel, a Davy, a Hunter, a Cuvier, or a Bell, to catch a glimpse of the mind and scheme of the Eternal Creator himself. Honoured, in every age of the world, be the names of these and of many other highly privileged instruments of *natural* communication, between the Author of the Universe and the mass of human-kind! But for their endowments and research, what would have been the progress of the physical aud organical sciences, the study of which, as we now know them, is so efficacious in expanding and elevating, both intellectually and morally, the human mind, and supplies so many proofs of creative goodness, wisdom and power!



Now with hosts of kindred (though perhaps less able) interpreters of nature than these, and with countless enlightening and ennobling views, is the well educated student of medicine brought in contact. And while of medicine, as of poetry, it may be said,

"A little knowlege is a dangerous thing,"

no position can be more safely assumed, than that a complete medical education conduces not more to mere practical attainments in the healing art, than to the formation of a generally elevated intellectual and moral character.

The conservative operations of the human frame in health, the curious alterations, and even the suppression of these, effected by a thousand morbid agencies, its frequent self-rectifying efforts in cases of disease and of accident, the best methods and means of promoting and inducing these, —the faculties also of the human mind, and its operations individually and collectively,—then the characters of animal and vegetable organizations, the qualities and uses of mineral substances, the analysis and antidotes of poisons, and the whole range of general and local terrestrial conditions and changes, embracing geology, soils, waters, climes, and weather,—*all* come under the notice of the regular cultivator of medicine; and patient enquiries into all and each of them concur in supplying the elements of that elevation of character already alluded to. Such being the scope and relations of medical science, and all its honourable cultivators feeling it imperative to bestow as impartial, skilful, and complete an application of its principles on the poor as on the rich,—it may at once be perceived of how great

public advantage and expediency it will be, that not only a *high*, but an *uniform*, standard of education,—admitting in all cases of extension, but not in any case of reduction,—should be prescribed to all who aspire to the difficult and responsible duties of the Healing Art, in any or in all of its relations. And by implication it will also be seen how unjustifiable,—because how publicly injurious, must be the course *both* of individuals, not thus disciplined and instructed, rushing, incapable and unwarranted, on these high duties, *and* of the government of an enlightened country that would, for the paltry pecuniary consideration of from 30,000*l.* to 50,000*l.* of stamp duties per annum, allow such characters to impose upon, and endanger the lives of, the nominal subjects of its rule and care. (D)

We shall next follow the medical philosopher on his emergence from that portion of his comprehensive curriculum of educational discipline to which we have briefly adverted.

His highest and most legitimate career, now, is that of accurate observation, occasional pertinent experiment, systematic research, careful induction, and sound generalization of as many facts as possible, bearing on what may, for the time, be the subject of his enquiry. These labours are preparatory to his engaging in the deeply responsible duties of medical practice; and upon them he enters, not single handed, but efficiently supported by the select lore of ancient repositories, and by the more numerous and splendid aids of modern proficiency. He succeeds in connecting together, and in thence drawing most important physiological and practical inferences, numerous



isolated phenomena which must, to the mere Empiric, appear single, and unexplained, and unavailable in the treatment of disease. Further, he has, in many interesting examples, constructed theories,—the soundness of which has been shewn *by the test of every true theory in any science*, viz., that "besides accounting for the class of phenomena that suggested it, it supplies an unforeseen explanation of other known facts, and predicts phenomena," that would otherwise have been not at all, or only conjecturally, anticipated. From amongst many splendid instances of such an achievement in medical science, may be cited those of the incalculably valuable labours of Sir Charles Bell, and of Dr. M. Hall, in illustration of the functions of certain portions of the nervous system, perhaps previously *guessed* at, but certainly never previously *demonstrated*, nor so understood as to enable us to arrive at those important practical results, to which these highly gifted men have conducted us. To enumerate a tithe of the instances in which the laws of mechanical, electrical, chemical, acoustic, optical, and other sciences, have been applied to medical investigations with the richest results to the diagnostic and therapeutic branches of our art, would far exceed the limits of this address. Such as are unacquainted with these may rest assured that the "means and appliances" thence derived by modern scientific medicine are so numerous, so interesting, and so valuable in a practical view, as to have entirely changed its whole aspect and capabilities.

Medical science, thus reconstructed, amplified, and stamped with the sterling seal of inductive

philosophy, now begins to exhibit not only the features of her more "exact" sisters, but their powers and performances as well. To take one very intelligible instance out of many;—After a due recognition of the independence and of the doctrines of general Anatomy, (i.e. of the intrinsic and distinctive characters of the different tissues composing the body,) the previously observed empirical effects of various remedies on certain organs were investigated in reference to each one of the several tissues entering into the composition of such organs,—were then localised in a certain tissue, and their operation rationally suggested and successfully applied in reference to the corresponding tissue of other organs, for the diseases of which they had either never before been used at all, or at least not systematically.

Now, not in medicine only, but, to take a familiar example, in navigation,—and in sundry other instances of the combination of a lofty science with a practical art of high utility, the common observations with which, as Whewell remarks, these and *all sciences* begin, must be *precise*. These are to be followed by *scientific observation*, then by *experiment*, then by the application of *tentative hypotheses*, in succession, until *one* be found capable of accounting for *all* the observed phenomena, and at the same time of explaining and of predicting others,—which characters, as before remarked, are the test of *a true theory*. Should any uninstructed or half instructed amateur, in either of these sciences, make observations which are *not* precise, his succeeding labours will be prejudiced, and his practical success precluded. Perhaps, however, he may observe well, and conduct experiments neatly, yet in too limited a way,—in which case he will be likely to rest on some vague, narrow, and misleading hypothesis, which will no more supply the invaluable services of a true theory, than a key, in no wise fitting a given lock, can be made to open or shut that lock. A man thus attempting to acquire, and, on the ground of so imperfect attainments, to practice the art of navigation, might be styled a *nautical quack*. Of works on navigation he may have read and studied *a little*; with nautical terms he may be pretty familiar; but for nautical practice he would be totally unfit. The most direct action of the breeze on the extended canvass,—the simplest effect of an acute inclination of the rudder, he would doubtless understand. But he would probably be ignorant of the greater part of the complicated cordage and other apparatus of the vessel,—would be unable to make a practical use of the sextant and compass,—incapable of the long continued, steady, and judicious efforts, requisite for the safe conduct of a long voyage,—quite incompetent to manage the vessel in a storm, and would be likely to do most direct and instantaneous mischief, in any emergency, by the hurried exertion of perhaps great, but unskilful, energy.



Precisely such are the relations of the science and practice of medicine.—In the first place, the very observation of non-professional persons, even of considerable acuteness of natural parts, is, instead of being *precise*, and complete, often singularly inaccurate, and limited in extent and bearing; while the analogies they trace are, in consequence, just as unreal and untenable,—and,

it need scarcely be added, their practice erroneous and injurious in the same proportion, save through the intervention of some fortunate casualty.

To take *small-pox* as instancing the correctness of this allegation:—It is an eruptive disease, preceded and accompanied by fever, and of which many die. Now, exactly the same circumstances can be predicated of measles and of scarlatina. But in these last mentioned complaints it usually holds good, that when the eruption is most abundant, the danger is least; whereas of fully-developed small-pox no one, probably, ever died, without a copious eruption. Medical observation and reasoning having caught, and rightly estimated, the distinctive characters and tendencies of these respective eruptions, have established the excellent rule of lessening the eruption of small-pox, by early exposure of the sufferer to cool air, and by other means, with the direct view and the direct result of diminishing the danger of the attack. Yet, overlooking facts, and misled by false analogies, the universal popular observation and belief, except of those who have learnt the truth from a professional source, amount to this,—that it is an advantage in small-pox to have an abundant eruption—to force it if deficient, and for that purpose to apply external warmth, and internally cordials and warm drinks—an idea and a practice founded in error and fraught with danger.—Again—The popular belief is, that the more severe an attack of small-pox may be, the more effectually will it protect against another attack; whereas the reverse is the actual and invariable fact. And further, the practice of small-pox in-



oculation—a step that, 80 or 100 years ago, was, comparatively speaking, so beneficial to individuals as to conduct safely through the disease six out of every seven subjected to it—has been too generally looked upon, by an uninformed public, and by ignorant pretenders in medicine, as a public boon, and even as entitled to maintain its ground against the incomparably superior operation of vaccination; whereas the fact is, that in former years the introduction of small-pox inoculation, now most properly proscribed by statute law, increased the mortality from small-pox by nearly 10,000 deaths annually, in consequence, simply, of the virus being every where disseminated, and every where in active operation.

These few, from among vast numbers of similar examples, are merely adduced for the purpose of proving what is generally admitted, yet is apt, in particular instances, to be overlooked, viz., 1st, that the mass of human kind are not found, nor can they be expected, to observe, to know, nor to carry into effect, scientific and systematic truths, elicited and established only by systematic and scientific investigators; and 2nd, that such having been the predicament of the multitude, in all ages and countries, and still being so, though to a gradually lessening extent, in our own age and country, the interests of the physical health, comfort, and prosperity of every community, *loudly demand*, in their own name, and in that of truth, reason, and policy, that the credulous minds of the passive majority be forthwith, on this subject, enlightened, disabused, and undeceived, by an impartial setting forth, on the one hand, of the claims of legitimate medicine to the

unqualified support of the nation and of its government, and, on the other, by a faithful exposition of the hollow pretensions and dangerous practices of modern empiricism.

We do not deny that of the whole tribe of unauthorized practitioners, there may be some who exercise observation of medical facts, but we affirm that their observations are of too limited extent and bearing. We do not deny that the modern "Empiric" institutes *some* experiments, and hence the unworthy application of the title to such a character,—but we affirm that they are all defective, and involve too little of discrimination to subserve the strict purposes of either the philosophic student or practitioner. We affirm, that instead of obtaining comprehensive views of the varied and vastly extended domain of medical science, the gaze he bestows on it, if indeed he ever gaze on it at all, is vacant and unreasoning; and, in short, that his method, if method we may entitle his career of one idea, is baseless,—insecure,—practically barren of good, but of ruinous consequences most prolific.

Advancing from the meagre and imperfect education in medical matters that quackery can boast, to the consideration of the large and varied class of phenomena of healthy and of diseased bodies, we find that the only glance she can bestow thereon is that of the uninitiated, of the ignorant, and of the undiscriminating. She has profited nothing by the accumulated, sifted, and well-reasoned lore of bygone ages;—she is unenlightened by the discoveries and interpretations of contemporaneous genius; she is unenriched by the appropriation to herself of



the best lessons of the best masters; by native talent she is, generally, wholly uncharacterized; and as for any elevated moral faculty, incompatible with empty pretensions, and with conscious imposture, to quackery we look in vain.

Wholly ignorant of *anatomy*, she cannot suggest, improve, nor practice any, even the simplest operation, nor the simplest medical diagnosis, *based upon its knowledge*. Such suggestions and improvements are, it is true, often long in occurring to the minds of even the scientific cultivators of medicine, but to the minds of these alone they do occur. And in some instances, it is curious to observe how (perhaps) a tolerably obvious principle may be introduced into general and successful practice by one individual, who applies it to a given species of cases,—while it devolves on other individuals, in succession, to extend its application, with equal éclat and success, to other, yet analogous, cases, not attempted by the originator of the practice. For example, a few years back Stromeyer, of Hanover, publicly established, openly communicated, and minutely described—[for true science disdains to keep an improvement secret]—the transcendent success of a peculiar method of dividing the tendon of one or more muscles of the foot, in case of distortion. But it was left to others to apply the same principle in the cure of other distortions, such as wry-neck, lateral curvature of the spine, and squinting. "So true is it," as remarked by the learned historian of the inductive sciences, "that a certain succession of time and of persons is *generally* necessary to familiarise men with one thought, before they

can advance to that which is the next in order." That such succession is, however, not *always* necessary to that end, we have splendid proof in the extensive, varied, and nearly complete category of the physical thoracic signs, partly discovered, partly conceived, and entirely wrought out, by the immortal Laennec.—Have any similar examples of acuteness, genius, and disinterestedness, ever been furnished by the ranks of quackery? Has she ever either accomplished, attempted, or conceived, a connected series of investigations, with a view to throw light on the structure and functions of the human body, or to develope rational modes of preventing or of curing disease? When did any of her host, at an immense expenditure of intellectual labour, of time, of pecuniary means, and of health, ever conceive, propound, and succeed in generally establishing, so transcendently beneficial a measure, as the substitution of the *vaccine* for the *human* variolous fluid, for the purpose of inoculation?—Never.

But if quackery has not, on any occasion, *taken the lead* in so useful and meritorious a career,—has she ever even *assisted*, or attempted to carry out, the scientific labours of regular medicine? In further reference, for example, to vaccination, has she done aught towards the investigation of the origin, affinities, and powers, of cow-pox, or of the utility of re-vaccination, or of the means of renewing the supply from the cow? Never.—In regard to vaccination, all that she has done has been, according to her usual custom, blindly to take up its practice, without at all understanding its nature. And to the undiscriminating way in which the various uninstructed,



unauthorized, and self-constituted operators of this country have practised vaccine inoculation, (apparently a most simple proceeding, but really involving many most delicate and important points of distinction,) is to be chiefly ascribed the equivocal success of the measure in the case of some localities and of some individuals. For, by irregular and careless practice not only is the success of any one case of vaccination most readily prejudiced, but every subsequent infection from that source will, through whose-soever hands it may pass, in all probability fail equally (or even more) in affording protection. But these are results, be it observed, that cannot with any fairness be charged upon true and proper vaccination, performed, *from the commencement*, by competent persons, and with due care and discrimination.

To proceed with our contrast.—Ignorant of chemistry as a science, quackery is incapacitated from giving us instructive and practically useful analyses of the solids and fluids of a diseased body or organ; is incapacitated from the rational conception and accomplishment of new combinations of elements, not previously known nor used as remedies, or otherwise; and is equally incompetent to suggest or to apply, on rational principles, and in a successful method, these and other remedies in conditions of the body adapted to their use. Ignorant of physiology, that is—of the science of vital phenomena, she knows nothing of the many recondite and curiously established sympathies existing between various and often distant parts of the living body, nothing of the medium of their manifestation, nor of the method nor of the usefulness of either exciting or repress-

ing them as occasion may require. These sympathetic and other phenomena of the living body she may see with the outward eye, yet she understands them not: of their connections, causes, and relations generally to disease and to cure, she either entertains an erroneous view, or none at all. Of the operation of her thousand panaceæ on a frame of whose structure and functions she is quite uninformed, she knows, she enquires into, nothing beyond whatever mere outward visible effect may happen to occur. Many most important elements of the therapeutic problem are thus hidden from her view, and therapeutic success effectually placed beyond her reach.—Of the vastly different susceptibilities to the operation of many remedies, especially of narcotics, characterizing infant and adult life, she is either deplorably ignorant, or culpably heedless. In short, of all the essential and complete means of discriminating diseases, remedies, and occasions, she possesses no knowledge, she affects no estimation; and even the probable effects of her own nostrums, whatever she may confidently pretend, she has no rational means of predicting. She must, in consequence, be pronounced totally incompetent to undertake the treatment of any disease. Her pretensions rest not on the scientific and legitimate basis so easily available in civilized countries to all upright enquirers after truth, and deserve on that account to be viewed suspiciously, to be exposed thoroughly, and to be silenced peremptorily and lastingly. Her professions to cure and alleviate suffering are necessarily, in an overwhelming proportion of instances, put forth in the spirit of lying ignorance, of wilful



fraud, and of insatiable and reckless rapacity, and are consequently fraught with many and great dangers to the indiscreet individuals who put faith in them, and make personal trial of their validity. In a populous—even though generally enlightened—community, the ignorant yet artful pretender will, when permitted by inadequate laws, find an abundant harvest of credulous and incautious dupes, whose disappointed expectations and injured health will ever remain a secret in their own bosom, rather than that their imprudence should be generally known. And further, such is human nature that a very large proportion of those who would hesitate whether more to blame or to pity the victims of the quack, would themselves, when affected by real or imaginary disease, lend a ready and a believing ear to the confident and seductive assurances of the same deceiver.

It is by no means asserted, nor meant to be conveyed, that the remedial means applied by a well educated medical practitioner invariably succeed in a proportion conformable to the completeness of his education, to the extent of his knowledge, and to his subsequent more or less ample experience. But by the avowed frequency of the occurrence of most complex and difficult problems in the practice of medicine, the position of the instructed practitioner is not at all lowered, nor the awful defects of the empiric one whit compensated or excused. For *in all cases* the former has the advantage over the latter; and whether, in the conscious possession of superior knowledge and means of cure, he achieve what the other neither knows nor can accomplish, or whether he satisfy himself with alleviation, or

even with non-interfering observation, in cases where the latter would unskilfully and injuriously meddle, he alike feels, enjoys, and becomingly manifests to others, the superiority of even limited science, so far as it goes, over nearly unlimited ignorance and assurance.

Neither do we mean to assert that no irregular practitioner can originate an useful plan of treatment, or may discover an useful medicine. The latter contribution to the good of human-kind has, doubtless, usually been the result of accident, and might come from the hands of one far below even the European quack in various kinds of knowledge, just as, for example, the anti-periodic power of Peruvian bark was discovered by an American Indian. But without a thorough knowledge of medicine neither the quack nor the savage can rightly wield that potent remedy, which, without discrimination in applying it, may just as easily be the vehicle of serious danger as of healing power. And so also of antimony,—(the reputed non-medical discoverer of whose activity had nearly therewith caused the death of his fellow-ecclesiastics,)—of opium, and of all the more active medicines.

Having thus laid modern empiricism along-side modern medicine, having tried her in the balances of truth and found her awfully defective in every scientific and practical qualification, little more need be added to point out the gross immorality of undertaking, of practising, and of allowing under the apparent sanction of legal authority, a system that can only be designated as one of atrocious imposition, fraught with danger and with death. By way, however, of completing the contrast, it may not be amiss to conclude this portion of the Address by an enquiry into the amount of any benevolent, disinterested, or costly labours, that quackery may, perchance, have voluntarily undertaken on behalf of that public which so suicidally tolerates and endows it.



So liberal, and constant, and freely given, is that endowment and patronage, that one might with reason suppose, either that the host of charlatans of all descriptions had long been in the habit of conferring great favours upon and of making great sacrifices for the good of the community, and that the latter was using daily efforts to pay off its debt of gratitude,—or at all events that the former, if they possessed a spark of that generous virtue, would doubtless, in return for value received, be impelled to carry out their plans of philanthropy to the utmost possible extent, neither would hesitate, if able, to give to the world incontestable proofs of practical skill and benevolence, by the gratuitous treatment of the poor, by suggesting and concurring in the institution and support of dispensaries and hospitals, and by numerous other noble exertions, calculated alike to promote the interests of science and of humanity.

And on the other hand, one might expect to find the well educated and duly authorized practitioner of medicine, not merely expressing the discontent, disappointment, and indignation of an upright mind, on the discovery that his hardly won titles may, with impunity, be assumed by any unqualified pretender,—that his diploma avails him not except for official engagements,

that his scientific qualifications are lost sight of amid the meretricious display and the nauseous repetitions of contraband competitors, and his just rights openly and shamefully infringed,—but further, denying gratuitous public services to an undiscerning and unjust community,—apathetic towards the penniless and uninfluential poor,—and indifferent to all the physical and moral interests of society.

But into the real facts of the case, we entreat the public to institute a most strict scrutiny. We entreat it to search "whether these things be so," and to act with us, or against us, according to the result of the enquiry; being well satisfied that, in the case of the British public, nothing more is necessary than a complete understanding of the question, to induce it at once to declare for and take the right side. In the meantime, it may not be amiss to recount a few of the circumstances which such a scrutiny would disclose. It would find medical men almost every where and in every way engaged in attempting, oftener gratuitously than otherwise, to ameliorate the condition, to increase the happiness, and to promote all the best interests, of the human race. It would find them, year after year, conducting the laborious medical and surgical duties of dispensaries and hospitals, without any further remuneration than the satisfaction of doing good, and the gratitude of their suffering fellow-men. It would find them, both in public and in private practice, undertake, without shrinking, the most arduous and responsible duties that may chance to devolve upon them. It would always find them readily and disinterestedly inclined to impart to the public a knowledge, not only of the means of cure, but of the means of preserving health, of preventing disease, and so of avoiding the necessity even of their own ministrations. And it would find them not only thus devoted to every laudable form of professional exertion, but amongst the foremost in the attempts now being universally made to supply popular instruction in literature, in science, and in natural history.—No such traits, however will be found to characterize the empiric. One cannot, indeed, fail to admire the artful disposal of his lures and of his snares, nor his just appreciation of human nature and of fitting opportunities. These he knows too well to doubt that, by reiterated assurances of skill and announcements of cures, he will succeed in entrapping numbers of ill-informed and unwary persons, and even not a few of the intelligent and discreet.



But difficult as it may be for the unenlightened and the thoughtless to distinguish between true and false pretensions to medical competency, and anomalous and inconsistent as may appear the spirit of the laws that at once establish a legimate profession, and yet give a tacit sanction to a trading empiricism, there exist, nevertheless, a few decisive criteria of the *real*, the *conscious*, and the *legally understood* inadequacy of the latter. And these are as follow:—1st, The title and pretension to medical practice, put forth by the empiric, are self-assumed, and are neither given, nor guaranteed, by any competent examining board. —2ndly, It is a remarkable circumstance that, in general, quacks of all descriptions neither have credit with the public, *nor dare to take upon*

*themselves, personally* to treat acute and dangerous diseases, nor to perform operations requiring anatomical skill. Fully aware of their incompetency to undertake such offices, they discreetly leave them to the instructed practitioner, and confine themselves, in most instances, to the indiscriminate and confident recommendation of one or a few remedies, or perhaps of many remedies at random, as a career in which there will be less risk of direct personal discomfiture and exposure.—3rdly, no one whose medical qualifications are not high and well attested, is allowed to enter into the official service of his country. Hence the charlatan, *however freely permitted to tamper with the health and lives of civilians,* is effectually excluded from all opportunity of compromising those of the more immediate servants and wards of the government, as, for instance, in the army, navy, and prisons of the empire.

## II. On the actual condition of the authorized medical profession in these realms, in reference to its internal regulations and constitution,—to the operation of statute laws,—and to the invasions of irregular practitioners connived at by government.

It is to be feared that the comparative sketch which has now been given, of regular medicine and of modern empiricism, may seem tedious. But the hope may, on the other hand, be entertained, that its fulness will enable the two remaining heads of this Address to be much more briefly disposed of, and their matter and positions to be much more convincingly expounded and enforced. Thus, not only have the relative characters of medical science and of medical charlatanism been descanted on, but of necessity also not a little of their relative position and of their unseemly—their disgraceful—contact, in these realms.

And again;—the contrast which has, less ably than faithfully, this day been exhibited, will suffice, with many, to establish the exclusive title of scientific medicine to the countenance and support of the public and of the government, and will render it unnecessary to urge many arguments on the justice, public expediency, and necessity, of the measures enumerated under our third head.

As to the internal condition of the profession in these realms, it is anomalous, and devoid of

that consenting uniformity of elements and sympathy of members, that are at once the sign and the pledge of a healthful organization.—Is it on this account objected, that the views entertained by, and the complaints emanating from, such a body, are undeserving of public attention? The answer is no less valid than prompt. Just as in the case of an individual some members of the frame may suffer without involving the intelligent powers, so we allow that our profession may be *painfully* sensible of corporate imperfections, introduced or maintained by injurious external agencies; but we also affirm that the loud and unanimous appeal of above five thousand of its members, on matters of vital interest to the public, and of which they court the most open and searching scrutiny, ought, on that very account, to receive the more consideration. For, the corporate evils of which we complain are not intrinsic blemishes of the profession itself, but mainly result from a defective, unmethodical, and patched system of *state* legislation and interference. And when those who are able and willing to try the question by the test of reason and truth, put forth repeated complaints, and unanswerable proofs, of receiving such treatment at the hands of their country's laws and government, as at once is unjust and impolitic, retards the progress of medical science, and thus robs the public of rich yet growing advantages,—it surely behoves their country, their legislators, and their rulers, (who are themselves accused parties as well as judges in the matter,) to rest not until the grave charge be thoroughly cleared up.

As human judgment, in the main, is weak and



erring, while human passions are strong, quick in improving an opportunity, and powerful in perverting the judgment and in silencing the conscience, so in all human institutions and affairs "offences must needs come." Now one of these, amongst others, in the administration of medical matters, is the circumstance of injudicious legal arrangements opening a wide door to ignorant and pretending cupidity. Hence, while shewing the justice of our cause, and the manifold public and private evils resulting from the mal-administration of medical affairs, we disclaim all hostility to *individuals* beyond that which we bear to a *system* of error, danger, and misrule,—and all intention of charging on them, personally, what appears to result from certain profoundly settled laws of human nature in its present phase. And inasmuch as nothing more favours the licentious, imperious, and wayward sway of the passions over reason, than does a condition of ignorance, we are willing to believe that, be human nature what it may, it is by ignorance that many of its greatest errors are fostered, and from ignorance that many of them spring. Our confidence in the reasonableness and security of our positions is, therefore, fully equalled by the assurance we entertain, that when these shall have been fully demonstrated to and understood by the British public and government, importunate entreaties for justice at their hands will be no longer necessary. It is from the general ignorance of medicine and its relations, (too effectually encouraged by the present anomalous condition of things,)—that we have the most to fear, and from the dissipation of that ignorance that we have every thing to hope.

It is obvious that, previously to the consolidation of the realms now composing the United Kingdom, their political independence and opposition would demand the *separate* existence in each of, (amongst other institutions,) one or more ruling medical incorporations; and that as one of the characteristics of these, *uniformity of plan, of education,* and *of title conferred,* could not at that time be reasonably expected to be found. Now, however, that England, Scotland, and Ireland form one empire, the existence of *nearly twenty* SOURCES OF MEDICAL TITLES, (not to speak of the number of educational institutions, to which, simply as such, these remarks do not apply,) is found to occasion much needless and hurtful confusion and variety, to encourage depreciating competition, consequently to give birth and currency to not a few instances of professional incompetency, and thus to retard, rather than to advance, the progress of medical science, and to restrict its capability of efficiently serving the public. Further, it has been well remarked that many defects in our numerous medical corporations "have arisen from the *limited and imperfect nature of the powers* confided to them, and that for these they must not be held accountable. The College of Surgeons in London, for example, could not prevent persons practising surgery without its diploma." (E)

But besides these evils of superfluous number, conflicting plans and operations, and too limited powers, our licensing institutions have also, of themselves, fallen into various errors replete with prejudice to the best interests of medical science, to the respectability of the profession at large, and to questions of public health. When first



founded, it is alleged that they considered the knowledge and art of healing as embracing alike the treatment of all internal and external diseases, and that of all conditions and accidents requiring manual assistance and operations. In other words, medical and surgical science, education, and practice, as now distinguished and separated from each other, *were then held as constituting parts of one indivisible whole.* And that view alone accords with nature, with reason, and with the most perfect plans of practical utility, whether privately or publicly applied. For the fact is incontrovertible, and has been well and amply stated and illustrated by eminent men, practising in both departments, (for instance by Carmichael and O'Beirne,) that no one can adequately engage in *either,* who is not, by education, master of *both.* Thus, the treatment of a surgical case frequently involves points of the nicest medical discrimination and tact, while on the other hand many medical cases necessarily require for their happy termination, competent surgical inspection and interference. Yet the colleges have originated and maintained these and other unscientific, unnatural, and injurious distinctions. (F) But just as of the three last mentioned criteria of quacks (p. 24) one that was pointed out was the legal recognition of their incompetency in their exclusion from all official situations, so we may here adduce, as proof of the legal recognition of the unity of physic and surgery, the fact that each regiment, ship, and gaol, is provided with a competent practitioner *combining all necessary qualifications in his own person.*

Again, when the acting members of the pro-

fession are slighted, insulted, and overlooked by the government, and their valuable and competent labours either superseded or inadequately remunerated,—no council, board, hall, nor college, has ever stepped forward on behalf even of its own licentiates, to defend their rights, to recommend their claims, or to remonstrate against their oppression and degradation. To take one series of instances: it has happened, in the course of certain preparatory and public enquiries in reference to epidemic pestilence and other matters, that youthful barristers have received from 2½ to 10 times the amount of daily pay given to medical men of considerable experience and practice, besides that travelling expenses were allowed the former, and withheld from the latter. (This occurred in Ireland.) And while the remuneration of barristers, engaged in administering the poor laws, and in other public duties, has been uniformly high, medical men have found *themselves* aggrieved and insulted, and the sanitary interests of *the poor* most unworthily estimated, (G) by the adoption, in reference to their services, of what has, by a sad misnomer, been called the "tender" system. And will it be believed that in carrying out to its farthest extreme this system of medical degradation, certain poor-law authorities would condescend, in public advertisement, to hold out to embarrassed members of the profession the bait of an opening in private practice on their official introduction? Yet such is the fact. [See cover of Lancet, March 28, 1840.] And very lately, when it was proposed to enquire into the sanitary condition of Scotland, notwithstanding the valuable and almost exclusive labours of



medical men in vital statistics, the commission devolved, as usual, upon a legal official, (viz. Mr. Chadwick).

Further, the superintendence of the effectual and ready extension of Jenner's valuable discovery to every hovel in the land, has lately been committed, over the heads of those to whom it belonged by every title of production, of right, and of reason, to the poor-law commissioners, whose original jurisdiction did not at all include many districts now subjected to them in their new capacity of comptrollers of public vaccination. And this has been done, too, while there already existed a National Vaccine Establishment, with a complete and rather expensive staff, paid out of the national exchequer, and under the direction of the president and others of the College of physicians, who appear to have viewed the proceeding with unbecoming apathy. (H) Now assuredly, no consideration can justify the infliction of these and similar wrongs, on a noble and learned profession, by a liberal and enlightened government in the nineteenth century. But what judgment remains to be passed upon the culpable remissness of nearly a score of *medical incorporations*, that would forbear, in this or in any age, to vindicate the rights of the profession at whose head they nominally stand, or on the conduct of the College of physicians in the particular instance just cited?

To recount all the defects of the existing medical corporations, in reference to constitution and powers, would far exceed the limits of this Essay; it must, therefore, suffice to point out only a few.—The incorporated Halls and nominal

superintendents of Physic, Surgery, and Pharmacy, in this country, *are not* bonâ fide representatives of the profession. They embrace not *the principle of representative government*, so *especially* applicable in the case of learned associations and professions, (as of all methods the best calculated to ensure the selection of the best men,) and so beneficially adopted in those of France. The three Halls in England have, in consequence, interests and objects too far from being identical with those of the profession, to induce or even to allow them to co-operate with it in great measures of general medical improvement. Neither have they interests nor objects in common amongst themselves. Thus, one of them succeeded, in 1815, in procuring the enactment of a law that involves the twofold evil of vexatiously coercing, without any exception, the licentiates of the other Halls; albeit that it, in common with every other, passes over with impunity the totally unqualified dabbler in medical practice, in surgery, and in drugs. We must, however, admit, and we do so with great satisfaction, that instances are not wanting of a University, or a Hall, opening wide its portals to the brightest rays issuing forth from the advancing luminaries of modern science, raising its curriculum and examination,—and thereby infusing a notable increase of merit into the ranks of the profession. The "frankness, energy, and spirit of self sacrifice," lately evinced by the Irish College of Surgeons, deserve honourable mention, and, with other examples, yield a delightful pledge and foretaste of the splendid efforts and ameliorations that, instead of forming



the exception, as now, would be *universally* achieved on the establishment of a general measure of consolidation and uniformity.

The composition of the profession, including as it does, members emanating from eighteen or nineteen rival sources, is thus, of necessity, vastly heterogeneous,—its materials ill-organized, its boundaries ill-defined, its relations to society at large fluctuating and uncertain, its competency irregularly guaranteed, and its labours inadequately protected; while the laws affecting it are, generally, most imperfect, discordant, and unjust. And from whom do the present complaints and remonstrances proceed? We entreat those to whom we appeal ever to bear in mind, that they come from *the members themselves* of our various disjointed institutions; in the amendment, uniformity, and firm consolidation of which, they foresee certain promise of advances in medical science, improvements in practice, and benefits to personal and public health.

Of the relations of *empiricism* to the laws and government of this country, little requires to be stated; but *that little* is of weighty and painful import. No medical institution is empowered either to prevent, or to suppress, the unqualified and incompetent practice of any branch of the healing Art. No legally authorized and enjoined scrutiny of the countless nostrums palmed upon public credulity, attests the zeal of "the powers that be" for the sanitary welfare of the community. *On the contrary*, any palpably ignorant adventurer, without exception, may actually procure *an apparent recognition*, at the hands of government, of his right to deal out mischief, and even

death, to thousands that are sufficiently credulous to intrust themselves to his reprehensible ministrations. And we even witness the distressing and degrading spectacle of the British government condescending, without scruple, to draw from 30,000*l.* to 50,000*l.* annually, from the sale of stamps (D) affixed to endless varieties of quack medicines, most noxious either in themselves, or by indiscriminate and unskilful application. When we reflect that the government that confers this seeming sanction on empiricism, and that allows any individual to prepare and sell, with impunity, medicines prescribed by himself or by another, is the same which concurs in enforcing every law, just or unjust, that directs and coerces the regular student and practitioner, and is the same which concurs in the prosecution, at the instance of Apothecaries' Hall, of duly qualified physicians and surgeons who should choose to prepare and make a charge for their own patients' medicines,—we must at once acknowledge that it stands rightfully charged with inconsistency, injustice, and neglect of the public weal. And these faults, which we will admit may be more of a passive than of an active kind, appear still more glaring when we look to the relations existing in France, Germany, and other countries, between their governments and medical Faculties respectively; the former giving every laudable encouragement and just countenance to the latter, appealing to them on all great questions of public health, and deriving from them most effective aid and counsel in every medical emergency affecting the community. Such a survey would also shew convincingly, how splendid a series of results can be elicited by well



organized and competent medical enquirers in the important public questions of vital statistics, salubrity of occupations and of localities,—the best measures to be adopted in case of epidemic visitations, and many others deeply affecting the public health; and would, doubtless, have the effect of creating generally throughout Great Britain an urgent desire to enjoy in the same, or even in a greater degree, the advantages of a good system of Medical Police.

## III. On the justice, public expediency, and necessity, of conferring on the medical profession a well defined and wholesome constitution,—an effective legal recognition, and unassailable privileges.

Sufficient evidence has now, it is hoped, been adduced, to show that the interests of the public health, no less than those of medical science, of truth, and of justice, stringently demand the interference of the legislature in the matters under consideration. They loudly call upon it, on the one hand, to use its influence and delegated powers in assisting to suppress every lying oracle, in extinguishing every false light, and in drying up every known and accessible source of public delusion and suffering; and on the other hand, to establish firmly, and give free scope to, those men and those institutions only, that are willing to be tested by the touch-stone of truth, and are conscientiously desirous of promoting the sanitary interests of the whole community, the advancement of science, and the worthy and free exercise of the almost divine Art of healing *on sound principles alone*.

The profession itself, however, must be remodelled; there must be conferred on its members universally, so high an *education*, as to exclude from its ranks the incompetency of which we have complained in others; and it must possess a *constitution* adapted to surrounding social circumstances and wants, according with the nature and spirit of medical science and art, and embracing sound and effective principles of *self-government*. In these two vital points, of EDUCATION and of GOVERNMENT, will doubtless lie the chief strength and efficiency of the legislative measures that we demand. For in an age daily advancing in intelligence, the relations between regular medicine and empiricism will undergo a necessary and spontaneous (though probably a very slow) change, *without legal interference*; and the mass of the people, after much and dearly-bought experience, will gradually withdraw their ill-bestowed patronage from the latter. But no such change can occur, without legal interference, in the constitution, and in the multifarious, conflicting, and otherwise exceptionable operations, of the numerous chartered corporations. Hence the necessity, the method, and the details of their re-organization, have been often and ably laid before the public by various writers; especially by Drs. Webster, Barlow, Maunsell, and O'Bierne; by Mr. Carmichael; and, though last, yet by no means least, by the zealous and talented Honorary Secretary of our Association, Mr. Carter. (I)

After the excellent Report which the latter gentleman has this morning read to us, it would be a superfluous and needless repetition to add any thing on the subject of future measures to what was presented to your consideration in that document; the general views contained in which are those unanimously adopted by the various associations. (J) Instead, therefore, of giving, by way of conclusion, a sketch of the *grounds* and *nature* of the proposed changes, as was my original purpose, you will permit me to entreat

you to carry in your memory, and, if occasion permit, to peruse, re-peruse, and make yourselves masters of, the plans so judiciously arranged and lucidly expounded in the able Report of our Council, already alluded to.

And if there be here present any of the non-medical members of the public, let them rest assured that their interests are as intimately bound up in the enquiry, and in the proposed measures, as are those of the profession itself. On this ground, and because, also, the public itself frequently remarks, suffers from, and justly condemns the many divisions and varieties exhibited by the medical world, we maintain, without reference to what is due to the interests of truth and science generally, that our non-medical friends lie under the greater obligation to afford us their hearty co-operation in this momentous work. They will, however, do the profession the justice to bear in mind, that the present movement is altogether, as yet, *internal*; and that, considering its unsatisfactory constitution, and its disadvantageous position and relations, its innate merits and strength must needs be great indeed, to enable it to commence and continue those gigantic efforts in the cause of truth, justice, and public utility, that now characterize it. From these efforts it now pledges itself never to cease, until it shall have cast aside every corrupt and heterodox connection and incumbrance, however long and closely yoked in dishonourable fellowship therewith; and shall have *regained*, with the prospect of ever henceforward *maintaining*, that dignified, untrammelled, and useful position in an enlightened community, that is its indisputable birthright.

# APPENDIX.

(A)

p. 4.

It may not here be amiss to give the solemn assurance, that the Medical Reform Associations have a much higher and nobler purpose in view, than to define, and apply to any individuals, names that may be needlessly offensive, or at all unmerited. Any other than the most rightful and publicly useful purposes, we altogether disavow.

We assume to ourselves also a title,—that of reformers, (to wit, of medical institutions and laws,) which we are well aware may, while agreeable to the ears of some, carry with it a strong prejudice to the minds of others. But in explanation of that title we wish it to be distinctly understood, that our project, though having reference to society, embraces *professional* and not *social* politics,—that similarly expressed questions in medical and in social politics stand on totally different grounds,—and that many most enlightened and influential advocates of the said medical reforms are, in general politics, of an opposite creed. Indeed, in the words of the eloquent and zealous CARMICHAEL, "we are much more deserving of the name of *aristocratic* than of *democratic* reformers. For, our object is to raise the qualification of candidates to the very highest standard, and thus to elevate the profession itself."

And in reference to existing medical colleges and halls, we may add the assurance that of such we by no means seek the *suppression*, but merely the *restriction to such offices* as they can undertake and accomplish *becomingly, honourably*, and *effectively*, for the public and professional good.

(B)

p. 5.

In proof of this assertion, the well-sketched instances adduced by Dr. Bostock, in his History of Medicine down to the present century, may be appealed to; in nearly all of which, similar habits of independent observation and induction are recorded, in almost identical terms. *See Cyclop. Pract. Med. vol.* 1.

(C)

p. 5.

Between these extremes there have arisen *some*, who have, "by the force of original and unaided genius" assumed certain positions afterwards legitimately established, yet have founded thereon methods of practice that are now generally condemned, as, in modern times, for example, BROWN: while *others* have constructed and promulgated *inaccurate* generalizations from a patient observation of facts, whose dogmas, never-

theless, are, when duly qualified by the impartial observer and sound reasoner, of the greatest theoretical and practical value,—as in the instance of Broussais.

(D)

pp. 8 and 34.

For a detailed exposition of the most important features and relations of quackery in these realms, reference may here be made to Dr. Cowan's (of Reading) masterly account of its statistics, and to his occasional Reports to the Council of the Provincial Medical and Surgical Association, published in its Transactions.

(E)

p. 28.

See the able "Statement" of Mr. C. T. Carter, read by him to the Council of the North of England Medical Association, in August. *Dublin Medical Press*, Sept. 2, 1840.

(F)

p. 29.

"The College of Physicians in London, which was instituted to preside over every department indiscriminately, long ago discarded surgery and pharmacy, whilst midwifery had been stigmatized by its president as an occupation foreign to the habits and feelings of gentlemen.—The College of Surgeons has displayed a similarly exclusive spirit with regard to the department more particularly under its control; and the Company of Apothecaries has always declined interfering with surgery, whether from a feeling of courtesy towards the College of Surgeons, or from a modest distrust of its fitness to meddle with that branch of science, we are unable to determine." (*See Mr. Carter's "Statement," loc. cit.*)

To avoid misconception on this subject, I shall here take leave, with deference, to express a little more fully the views respecting it which, I believe, I entertain in common with many, whose opinions are entitled to the highest consideration.

A knowledge, respectively, of the practice of Medicine, of Surgery, of Midwifery, and perhaps we may add of Pharmacy, constitutes one indivisible whole, which it is the province of one indivisible science to treat of and to expound, and of one pretty high (and of course nearly uniform) standard of education to confer; which last should not, in any case, be fallen short of, how far soever it might, in other instances, be surpassed at the candidate's option.

This statement, however, is not to be so mis-interpreted, as to be made to involve *any rule whatever* respecting the practice of *all* the branches, or of *any one* severally, of the healing art. Each course of procedure may, undoubtedly, have its advantages, under circumstances respectively allowing or demanding it.

The fault alleged against the present arrangements and practices of many of the Halls, (and in an especial and unqualified sense of the English Halls,) is, that they appear to have established, and still to maintain, such distinctions and subdivisions in medical *science*, in their curricula of *education*, and in the variety of their *diplomas*, or licenses, as can only,



with propriety, be recognised in the *practice* of our Art; in *every department* of which, moreover, with a single oppressive exception, any one thus *partially tested and licensed* is at liberty to engage.

(G)

p. 30.

"A statement was made to Lord John Russell, when Home Secretary, that out of 1830 practitioners employed under the Poor-Law Amendment Act, 327 had not been examined in Surgery, 323 had not been examined in Medicine, and 233 had not been examined at all!" *Dr. Cowan's Report to the Provincial Medical Association at its meeting at Southampton*, 1840.

(H)

p. 31.

We have, however, a most gratifying proof that an enlightened public and its press are now interested on our behalf, in the emphatic protests of The Times and Courier, published a few days ago, (Sept. 1840,) in denunciation of the delegation of such an office to the Poor-law Commissioners, and of the paltry remuneration recommended by them for vaccination,—a step which, as The Times remarks, is most impolitic as well as mean, because not likely to command adequate vaccination from *any*, much less from *self-reporting* and, probably, often self-entitled surgeons, —and which is, further, an instance of that shabby and restrictive economy, the reputation for which would alone seem to account for the bestowal of the office on the said Commissioners.

(I)

p. 37.

Reference may, in particular, be made to the concise and argumentative "Statement" of Mr. Carter before cited (*Dublin Medical Press, Sept.* 2, 1840); to the Report of the Council of this Association, founded on that "Statement," and read by him this day, copious extracts from which will be found in the following pages; to Reports of the proceedings and correspondence of the British Medical Association, published in the Lancet of the years 1838, 1839, and 1840; to the Transactions of the Provincial Medical and Surgical Association; and to accounts in the Lancet and in the Dublin Medical Press of the meetings, in Dublin, of the Irish College of Surgeons and of the Irish Medical Association, which were characterized by sound reason, fervid eloquence, and manly resolution.

(J)

p. 37.

Report of the Council of the North of England Medical Association.

(*Drawn up by Mr. Carter, and read at Carlisle, 15th Sept.*, 1840.)

* * * * * * "Not that there is in this kingdom a lack of Medical Colleges or Corporate Bodies—for of these there are no fewer than *eighteen*; but, unfortunately they are as dissimilar as they are nu-

merous. Each varies from another in character, regulations, government &c. The precise limits of their respective powers and authority are as imperfectly defined, as are the duties which should devolve on them individually. In their present disunited condition, the country is without any competent Board to which Government or the Legislature can apply for advice, in cases wherein it may be required, on behalf of the public safety or welfare—a fact which is strikingly exemplified in the circumstances which have recently occurred, in the passing of the 'Vaccination Extension Bill,' and in the inquiry now going on as to the health of towns by the Poor Law Commissioners, as well as in the existing arrangements for supplying the pauper population of England, (and perhaps it may be said, of Ireland also,) with medical relief.

"On the ground of education, the Corporate Bodies are equally defective. The curricula of study enjoined, and the examinations instituted, by each, differing essentially from those of another, an inducement is thereby held out for students to repair to those institutions from which their credentials can be obtained on the easiest terms. Medical *practice* being the same in ALL parts of the empire, it may be asked, Why should the modes of admission into it be so various? Why should there not be one code of regulations, instead of several? Why, furthermore, should a person who has been educated and licensed to practise in *one* division of the United Kingdom, be restrained for pursuing his avocation in another? or why should the same individual be obliged to appear before one Board to be examined in Medicine, Materia Medica, &c., while it is left to his own option whether or not he shall stand before another to be tested as to his acquirements in Surgery? In some of the Universities and Colleges, the same gentlemen act in the capacity both of teachers and examiners of their own pupils—a custom manifestly open to animadversion. In some, also, the fees of the examiners are dependent on the number of licenses and diplomas granted; and nearly the whole [of them are principally supported by the funds arising from the admission of members. No wonder, therefore, that laxity of discipline should sometimes prevail, or that in some of our chartered bodies certificates and honorary distinctions should be so much more easy of attainment than in others.

"So far as the interests of the practitioner of Medicine are concerned, the Medical Institutions of this country have subjected themselves to just and well-grounded complaints. That these interests should have been neglected, needs not, however, to excite surprise; for the greater part, if not the whole of the Corporations, are under the dominion of self-elected and irresponsible officers, the members at large having no control over establishments which they have contributed to support. Indeed, it may be asserted, that they possess no substantial privilege in virtue of their connection with those bodies; for after expending time and money in the acquirement of knowledge, they are not more protected and encouraged than is the avowed empiric, or the imposter, who, under an assumed title, is permitted to usurp the character and to exercise the calling of a medical practitioner. The unimpeded progress of quackery, for which this country is notorious, and the absence of proper control over druggists and other compounders of medicine, may be attributed, in a very great measure, to neglect of duty on the part of the Medical Corporations.

"A satisfactory administration of medical affairs is not to be expected, whilst our Colleges, &c., remain in their present isolated state. The profession evidently requires to be consolidated. Its members have



waited long, and not impatiently, for some spontaneous movement on the part of those bodies, which might tend to bring the several branches into union and harmony, and to create amongst them something like uniformity of operation; but they have been disappointed, and have consequently been led to reflect on the best means of accomplishing that which the Corporations seem unwilling to attempt; and a very general opinion prevails, that their object would be most effectually accomplished by the establishment of a General Medical College or Council, comprising three Executive Departments—one in England—another in Scotland—and a third in Ireland. * * * * * * * * In the minds of some persons, a considerable degree of jealousy appears to exist with regard to the supposed extent of power with which the formation of such a Council as is here spoken of, would invest the members of the profession. It should, however, be borne in mind, that a National College of Medicine would act as an *executive*, and not as a *legislative* body. It would have no power to *make* laws, but to superintend their due enforcement after they should have been made by Parliament, or to suggest the propriety of new ones. The operations of such a Council would be restrained by the connection which would subsist between it and the Crown; and its bye-laws, even, would probably be subjected to the inspection of the Judges.

"It should likewise be remembered, that as the profession is not represented in either branch of the Legislature, a Representative Council is the only medium through which its wants and feelings can be communicated to the ruling authorities of the country; and a momentary consideration of the little sympathy which has hitherto existed between its members and the present irresponsible Corporate Bodies, will explain the reason why they should wish to have a voice in the election of their Governors.

"The establishment of a General Medical College, it is believed, would be productive of benefits to the whole community.—Under its auspices the Public Health might be adequately protected, and Medical Police become a prominent object of cultivation. Sanitary precautions might be adopted in times of pestilential or epidemic diseases; the practice of Pharmacy might be placed under suitable control; and the dangers of empiricism exposed, and their baneful consequences materially diminished. The country might be supplied with a well-educated and highly-competent body of medical practitioners; and as a registry of all such would be preserved, any man who should assume a title in Medicine to which he had no legal claim, would be detected and subjected to punishment.

"In opposition to the views here stated, it may be urged, that if the changes contemplated in the foregoing remarks were carried into effect, an irreparable, if not a fatal injury, would be inflicted upon every Medical College and Corporation at present existing throughout Great Britain and Ireland. Such need not be the case: and no greater mistake can be committed than to suppose that the objects of Medical Reformers are to *destroy* those institutions. They wish not to *annihilate* but to *modify* their functions, leaving them to exercise those (and those only) which they are calculated to fulfil with efficiency. An attempt has been made to show, that, *under existing circumstances*, they are wholly unsuited to the purposes of good government, and, for reasons already assigned, that they are no better adapted to regulate education, or to superintend the examining and licensing of candidates for medical practice or medical honours. With respect to these particulars, there can be little doubt,

that uniform arrangements should be enforced throughout every part of the empire; and if this principle be conceded, there will be no inconsiderable difficulty in proving the necessity for entrusting their direction to a number of *different*, and (according to their own statements) of conflicting institutions. It has been said, if education were assimilated, and a high standard of proficiency were required, rural and thinly-peopled districts would be unprovided with medical attendants; but such an argument is untenable, and might easily be disproved.

"The appointment of a uniform test as the qualification for a license to exercise any or every branch of the healing art, need not prevent the licentiate from still further prosecuting his studies in a recognized University or School, or whilst engaged in actual practice; nor (it is conceived) can any valid objection be raised against the conferring of appropriate distinctions or titles, as the reward of well-ascertained superiority in either case. * * * * * *

"Under a new arrangement of the profession, the duties of examining and licensing would perhaps no longer devolve on those institutions by which they are at this time performed. * * *

"Medical Reformers are not desirous to *destroy* any existing College or Corporation; but, on the contrary, they are anxious to secure to it adequate resources for the fulfilment of every object which, from its nature and constitution, it is fitted to promote, at the same time that they are endeavouring to obtain, for the general superintendence of the whole profession, an efficient and comprehensive governing Council. If it be asked, in what manner finances sufficient for both purposes are to be provided, it may be answered, that the admission fees of licentiates would raise an income which would afford a surplus after the disbursements required for the support of existing establishments should have been made; and if this were inadequate to cover the expenditure of a National College, it might be augmented by the exaction of a small annual registration-fee from each member thereof, independently of the claim which the services of such a College would give it upon the public revenue. * * * *

"Medical Reform is a subject which presents strong claims to the attention of men of all shades of political opinion, for all are equally interested in the benefits it would confer. The designs of its advocates will bear the most searching investigation. They are neither selfish nor exclusive. They aim at placing the profession in the position it ought to occupy as a branch of national polity, and rendering it eminently conducive to the welfare and happiness of mankind."

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# SUPPLEMENT

TO THE

# PRINCIPLES OF SURGERY,

BY

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# PREFACE.

The circumstance of ten years having elapsed since the last edition of my "Principles of Surgery" was published, may at first sight seem to render it unfit for students of the present day; but when more carefully considered, will, I trust, lead to a different conclusion. This book was written at the request, and for the use of my pupils, when I taught systematic surgery. It never professed, or was intended to set forth all the opinions which were, had been, or might be entertained in regard to each point of surgical practice, but was limited to the statement of what I wished to explain and impress upon the gentlemen who attended my lectures. As the value of such a work must essentially depend upon the opportunities which its author has had for maturing his opinions and subjecting them to trial, I feel no shame in adverting to the fact, that the edition of this book, which is still in the hands of the reader, has, during the last ten years, been daily tried by the results of my practice in the clinical wards of the Royal Infirmary. Fourteen years' previous hospital experience had corrected the views which it gave in many respects, as will appear, if the first and subsequent editions are compared; and the Supplement now added, contains all that is requisite to explain the changes in my sentiments which have taken place within the more recent period.

In order to shew how necessary such a digest of practical principles is for the advantageous prosecution of a clinical course, I have prefixed an introductory lecture, explanatory of the objects and method I pursue in teaching.

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# SUPPLEMENT

TO

# THE PRINCIPLES OF SURGERY.

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## LECTURE INTRODUCTORY TO THE COURSE OF CLINICAL SURGERY, WINTER SESSION 1850-51.

In commencing the course of surgical instruction upon which we are about to enter, I must, in the first place, explain the objects it is proposed to attain, and the plan to be followed in their pursuit. The best way of doing this will be to consider what are the qualifications required for the practice of your profession. It is plain that you should be intimately acquainted with the structure of the machine, the derangements of which it is to be your business to remedy—that you should, so far as possible, know the uses of its various parts in a state of health—the changes to which they are liable from diseased action, or the influence of external circumstances—and the effects so produced, whether on the animal economy in general, or the local condition of the part concerned; also, that you should know the uses and applications of the various medical agents which are employed for the restoration of health—and the operative manipulations practised with a similar view; and for your guidance in the application of all this knowledge, that you should understand the rules established for selecting and exercising the means of remedy in each of the cases requiring them. No arguments are required to shew the absolute necessity of all that has been mentioned, namely, anatomy, physiology, morbid anatomy, pathology, materia medica, operative surgery, and the principles of surgical practice. But you may not be so well prepared for my next statement, which is, that possession to the utmost possible extent of all this varied and extensive instruction would not be sufficient to qualify you for the practice of your profession; and that, if you were to enter

upon it without being qualified in another way, immediately to be explained, you would find insuperable difficulties at every step.

The obstacles to which I allude depend upon the difficulty of ascertaining in any given case the precise seat and nature of the derangement which requires to be remedied. For instance, let us suppose that the patient has been thrown down with force, that he has not been able to rise from the ground, and that he has been conveyed to bed complaining of pain in the neighbourhood of the hip-joint. In such a case there can hardly be any doubt that one of three things has happened,—namely, dislocation of the thigh bone, fracture through the trochanters or neck of the bone, or bruise of the joint from violent compression of its articulating surfaces. The appropriate treatment for each of these derangements is clearly set forth in the principles of practice which are understood to have been learned, and the different manipulations requisite may be easily carried into effect. If the bone is displaced, it must be pulled in the proper direction for withdrawing it from its abnormal position; if fracture has occurred, the long splint should be applied to prevent motion of the broken surfaces at the seat of injury; and if the joint has been bruised, leeches, fomentation, and perfect rest of the articulation are required. It may, therefore, seem that a case of this kind should form an easy subject of treatment, and yet there are few rocks on which the patient's comfort and the surgeon's credit are more apt to suffer shipwreck. Let us take another case, and suppose that the patient labours under a tumour of the breast. In all probability, the swelling here must depend upon an abscess, a cyst, a fibrous growth, a simple enlargement of the gland, or a malignant degeneration of its texture. In the first of these conditions, the matter should be evacuated; in the second, the bag may be punctured or dissected out; in the third, the tumour may be removed with every prospect of permanent benefit; in the fourth, local treatment of a soothing kind, with what other means are requisite for correcting any derangement of the system concerned in its production; and, in the fifth, either free ablation of the breast, or, as is much more frequently the proper course, merely such palliatives as may tend to allay uneasiness and delay the morbid process. In all this there is little difficulty for either the head or hands, and yet there are



few subjects of surgical practice more perplexing than tumours of the breast. Indeed, you will see to-day a young woman who has come more than two hundred miles for relief from a fibrous growth, in consequence of her medical attendant—a very experienced and intelligent practitioner—entertaining doubts as to the nature of her case. In short, gentlemen, you will find that the great difficulty of practice is not in doing what is necessary, but in discovering what the circumstances of the case require, and ascertaining, in the first place, the seat and nature of whatever derangement has taken place.

In accomplishing these grand essential steps of an accurate diagnosis, you must be guided by the signs or symptoms which result from the morbid state of each part affected. Most of them are recognised by sight and touch, but some of them also by the ear and nose. According to the facility with which they are noticed, discriminated, and appreciated, as evidence of what is wrong, does the practitioner readily and surely ascertain the assistance which it is requisite that he should afford the patient. But although the indications are present, it does not follow that they make an impression on the mind so as to attract attention. You have all, doubtless, often heard or made the reply, "I must have seen, but did not observe," the object in question,—the meaning of which is, that though within the sphere of vision, it did not make an impression on the sense of sight,—and it is the same with regard to the other sources of information. How, then, you are now prepared to ask, are we to acquire the power of observing the signs which are to guide us in our progress? And here I may refer you to the invariable practice of all persons who desire to observe with nicety and precision the distinctive characters of different objects. In all pursuits, professions, and employments, which require for their successful exercise that this should be done, you will find that the power of doing it is always obtained in the same way,—namely, by careful examination of the circumstances to be distinguished, so as to fully understand and become familiar with them. The more familiarly acquainted with any object, the more readily you recognise it; and it is this familiarity with symptoms of disease which enables an experienced practitioner to judge quickly and correctly as to the condition of his patient.

You will now be able to see why hospital attendance has been enjoined as an essential part of your professional study.

You may read or hear the symptoms of disease described over and over again, without being able really to know them, or to acquire the power of observing them. But you have here an opportunity of witnessing the actual existence of morbid derangements in the living body, with all the sensible characters by which they are distinguished. Surgical cases bear a small proportion to the subjects of ordinary medical treatment; and it is, therefore, of peculiar importance, that you should study them when brought together in large establishments such as this. In the course of the ensuing six months, most, if not all of you, will see more surgical cases than any one will have to treat in the whole duration of his private practice, however much it may be prolonged. Indeed, I have heard gentlemen of considerable standing and experience declare, that in once going round the wards which are to be your field of study, they have seen more cases of surgery than all that had ever fallen under their treatment. But it must not be supposed that you are promised an opportunity of seeing an example of every case that may occur in the practice of surgery. This would plainly be quite impossible, and fortunately is not at all necessary, since each particular disease is not distinguished by characters exclusively belonging to it alone, but rather by certain combinations of characters which it possesses in common with many others. If, therefore, you acquire the requisite familiarity with symptoms, whatever may be their source, you will be able to recognise them, though differently grouped, in connexion with other morbid derangements.

The great duty imposed upon me as a teacher of clinical surgery will now also begin to appear. If left to "walk the wards" without assistance, you might be able to ascertain whether there were many operations or few, whether their performance was accomplished with ease or difficulty, and whether the patients died or recovered. But as hospital attendance, productive only of such fruits, would be of little value in your preparation for practice, it has been deemed expedient that a teacher should be provided for rendering this opportunity of observation more conducive to improvement. In discharging the duty thus confided to me, instead of merely lecturing upon the cases, and telling what may be learned from their examination, I bring the patients before you, having them conveyed in a basket if not able to walk, and carefully point out every circumstance that seems deserving of attention. So far as possible I let you see the people who are to be under treatment at the time of their admission, so that they may be presented just as they will be to yourselves when engaged in practice; and also, that you may witness the process of investigation which is pursued, in the first instance, for the recognition of their respective ailments. In the progress of treatment, I bring them again and again into this place (the great theatre of the hospital), so that the changes which have occurred may be duly explained. On alternate days I visit the wards, when you have an opportunity of seeing the patients more closely, and obtaining further information directly from themselves. On the two remaining days of each week (Sunday being a day of rest), the operations of too great importance for extemporaneous execution are performed. There is thus a constant system of instruction; and it is pursued, I am happy to say, not only with much advantage to you, but also with great satisfaction to the patients, who so far from feeling any unwillingness to have their cases examined in your presence, regard it as a guarantee for their careful treatment, and an expression of interest in their welfare.



In pointing out to you the distinctive characters of disease, I shall be careful to avoid perplexing you with irrelevant matter, as would seem too frequently done, if any judgment as to the practice of other schools may be formed from the lucubrations with which, under the title of "Clinical Lectures," the periodical medical press has of late years been teeming. When we see pages upon pages of closely printed statements, as to every minute circumstance that can be noted in the patient's organization, however remotely connected with the particular derangement in question, doubts may be entertained as to their ever having been delivered to a waking audience, but none as to their utter uselessness for accomplishing the object professedly in view. In describing any particular sort of stone, plant, or animal, we do not mention all the characters which it possesses in common with other members of the same family, but carefully select those points in which it differs from them; and you may recollect that Linnæus laid it down as a rule, in describing the species of plants, that no more than twelve words should ever be employed for the purpose. Indeed, it may be truly said, that, next to not observing the symptoms

of disease at all, the greatest error a practitioner can commit is to collect them, without reference to their relative importance as distinctive features of the case. Keeping this constantly in view, I shall be careful to explain the circumstances which constitute the ground of every opinion I may form in regard to the patients that come under our observation.

And here, gentlemen, I must beg to warn you against placing confidence in the use of certain means which have been proposed as assistants to diagnosis, but are too frequently employed as substitutes for the careful investigations most conducive to the attainment of this object. I allude more especially to the exploring needle and microscope, which are at present much in fashion for facilitating the recognition of morbid growths and deposits. It may seem, at first sight, that, with exception of the risk of exciting diseased action, which must always attend the thrusting of a foreign body through the living textures, no harm, at all events, can accrue from the information obtained in this way; but when the subject is more fully considered, I trust it will appear to you in a different view. For, in the first place, it must be admitted, that reliance upon such assistance encourages a lax and imperfect exercise of the other means which we possess for discovering the truth; and, secondly, it cannot be denied that reliance may be placed with much more safety upon the latter than upon the former alone.

It is upon such grounds that I have always had a great distrust of the exploring needle. But the microscope seems to me still more apt to mislead; and I am glad to take this opportunity of protesting against the importance which at present is most unduly attributed to it, as a means of distinguishing morbid growths. After making this statement, it would be useless to quote any experience of my own upon the subject, as the results would be attributed to prejudice or want of practice; and I will, therefore, select from the numerous mistakes that crowd into my memory, one that lately happened to a surgeon who has written strongly in favour of microscopical examination, who occupies a prominent place in his profession, and who was led to investigate the particular case concerned with peculiar care. The patient suffered from a tumour which threatened to prove fatal, and of which a small portion being subjected to the microscope, appeared to present the



characters of a malignant deposition. Biassed no doubt by this impression, the surgeon finally resolved that the case did not admit of remedy, and three other surgeons of note, after repeated consultations, agreed with him in this opinion. The patient then applied to me, when, paying no regard to the microscopical texture of the tumour, I carefully considered its situation, connexions, and history,—with the conclusion, that it was not connected with any unhealthy condition of the system, and that it might therefore be removed with every prospect of permanent relief. Acting under this persuasion, I performed the operation which was requisite, with the most satisfactory result. In short, gentlemen, I would say that the assistance which exploring needles and microscopes afford in the practice of surgery, may be compared to that which a lame man derives from the use of crutches. If he cannot walk without their support, he must of course avail himself of it; but need never expect to walk so well as one who is independent of such artificial aid. It is far from my intention to deny that the microscope may be of service in promoting the minute researches of anatomy, physiology, and pathology. But I maintain that it can never supply the want of that knowledge of obvious structure and sensible action in health as well as disease, which is essential for the discrimination of morbid textures with a view to their remedy.

I have now explained what may certainly be regarded as the principal duty confided to me; and have next to acquaint you with another, which, although it ranks of secondary importance, is calculated to exert a powerful influence over your professional qualifications. This is, rendering the principles of surgical practice intelligible and familiar to you, by teaching them in connexion with cases admitting of their application. They can never be so fully understood, or so well recollected, as when thus taught; as Horace says,—

> "Segnius irritant animos demissa per aurem,
> Quam quæ sunt oculis subjecta fidelibus."

And in support of this most true statement, I might appeal to the experience of my old pupils, who often remind me, with the freshness of yesterday, of what was said and done in lectures delivered more than twenty years ago. The impressions thus made being so permanent, I shall be careful to avoid mis-

leading you by hasty or too confident directions for your conduct; always keeping in mind, that everything stated here will, in all probability, be soon subjected to the test of experience, and may thus seriously affect the welfare of your patients, as well as your own professional character. I have, ever since taking the field as a teacher of surgery, been more anxious to establish claims for lasting confidence, than to afford merely temporary gratification, by glossing over the difficulties of practice; and I trust that, through a faithful pursuance of the same course, I shall be permitted to regard you as my friends when you cease to be my pupils. The principles which I propose to illustrate are contained in a work published under this title, "Principles of Surgery," with which, I think, you ought to provide yourselves, since the various schools and teachers hitherto concerned in your instruction, must otherwise give rise to a confusion that may seriously interfere with your deriving all the advantages I have led you to expect from our proceedings here. In this book I have endeavoured, not to collect all the conflicting and erroneous opinions which have been from time to time inflicted upon the patience and credulity of the profession, but rather to select and arrange, in the best order for understanding and recollecting, all that was really of practical value.

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## ON THE USE OF CHLOROFORM IN SURGERY.

The uncertain and not unfrequently injurious effects of ether which had been experienced during the short period of its employment for the prevention of suffering, rendered the introduction of chloroform as a substitute for this purpose, a boon of inestimable value in the practice of surgery. Surgeons of the present day, it is hoped, will seldom have an opportunity of witnessing the distress and difficulty dependent upon the patients retaining consciousness under an operation; and the following observations are offered with the view of removing some sources of apprehension which have delayed the general introduction, and restricted the proper employment of an agent so important, not only to the patient, but also to the operator.



The chloroform must, of course, be of good quality—such as that manufactured by Messrs. Duncan and Flockhart of this city—and should be administered, as originally advised by Dr. Simpson, through means of a folded handkerchief held loosely over the patient's nose and mouth. The inhalation is apt, in the first instance, to cause a spasmodic closure of the glottis; and when this is denoted by cessation of breathing, the handkerchief should be held aside until at least one inspiration is accomplished. Children and young females frequently pass at once into the state of profound sleep desired; but adults, especially of the male sex, usually become much excited, so as to talk wildly, incoherently, and inarticulately, and resist inhaling the chloroform by muscular efforts of the most energetic character, before falling into the condition of complete immobility and insensibility. The congested countenance and convulsive contortions of the limbs on such occasions are apt to deter from completion of the process, but should rather suggest a more copious administration of the agent, until perfect flaccidity of the muscles and the stertorous sound of respiration, proclaim that its effect has been fully attained. The handkerchief should then be withdrawn and reapplied occasionally so as to maintain the state of insensibility until the object of its induction is accomplished. However trifling this may be, the patient should always be placed in the horizontal posture, since syncope dependent upon temporary cessation of the action of the heart, which occasionally occurs, would be dangerous in the sitting or erect position of the body, and may probably have led to some of the fatal effects recorded, especially as most of these have occurred in cases of trivial importance, which of themselves would not have suggested the horizontal position. Ligatures on the throat, and tight articles of dress on the thorax, should always be removed; and if at any time the breathing is observed to become slow or cease altogether, respiration should be artificially excited by alternate compression and relaxation of the ribs, while fresh air is more freely admitted into the room, and cold water is thrown upon the face of the patient. It is seldom that such expedients are required, but the possibility of their being needed, should always be kept in mind to prevent any risk of those fatal issues which, it is believed, never have occurred under proper management.

As to the cases in which chloroform should be employed,

it may be said that there are hardly any in which pain would otherwise be inflicted where its use is not desirable for the patient, and incumbent upon the practitioner to propose. At an early period of our information on this subject, it was thought that in a state of collapse or extreme depression from weakness, fatal sinking would be apt to result from the effect of chloroform. But so far from this being the case, it has been found that the most serious operations may be performed under the influence of this agent in circumstances of the most extreme exhaustion, with results infinitely more successful than could have been anticipated otherwise. Thus the only example of permanent recovery after amputation at the hip-joint which has occurred in Scotland, was effected three years ago through the use of chloroform in a case where I performed the operation under chloroform, upon a patient apparently about to sink under the exhaustion of disease, and who, instead of shewing signs of depression from the liberty taken with his frame, awoke from his sleep with a smiling countenance, as if he had experienced relief instead of mutilation.

In operations upon the mouth or nose and neighbouring parts, involving these cavities, it has been generally deemed inexpedient to employ chloroform, lest during the patient's unconsciousness blood should enter the air passages and cause suffocation. Through careful attention to position and other circumstances, it has been found that the danger thus anticipated may be avoided; and if the operator is perfectly familiar with the whole process concerned, he may almost always abstain from inflicting pain even upon occasions of this kind. But if proper coolness and self-possession on the part of the surgeon and his assistants cannot be considered certain, it will be better to concentrate their attention upon the operation without any such embarrassment.

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## AMPUTATION.

### *Amputation at the Ankle.*

In the year 1842, I proposed a new mode of performing amputation at the ankle-joint, which seemed to free this operation from the objections previously alleged against it, and render it an advantageous substitute for removal of the leg in many of the cases which admitted of the latter measure as the only alternative for the patient's relief. Having frequently had occasion to amputate the leg for caries affecting the respective surfaces of the *astragalus* and *os calcis*, and leaving the ankle-joint perfectly sound, I was led to consider whether or no it might be possible to remove the whole disease and retain a useful support for the body, by performing disarticulation at the ankle, and saving the thick integuments of the sole of the foot to form a cushion to cover the ends of the bones. This experiment was tried in the hospital on the 20th of September 1842, with complete success, as will appear from the following letter addressed to me by the gentleman who committed the patient to my care, four years after the operation was performed.



"DUNBAR, *4th June* 1846.

"MY DEAR SIR,—It gave me great pleasure to hear, by yours of the 2d instant, that the boy Fargie's case is likely to terminate so satisfactorily.

"I sent for the boy Wood, whose life was saved by a similar operation, executed by you two or three years ago (September 1842, age sixteen). I examined most carefully the *stump*, which was all sound. He had had a renewal of the false foot since he had seen you. He told me he suffered no inconvenience from the stump, or the slightest tenderness. He has become a country tailor, and has often ten and fifteen miles a-day to go to his work; still he feels no *discomfort*. He says, he, with a few of his young comrades, ran off to see the operations of the North British Railway at Penmanshiel tunnel, and must have walked fully thirty to thirty-five miles, without feeling his amputated limb.

"You may rely upon it, nothing can be more satisfactory than this case of the boy Wood; and if Fargie's and all similar cases prove, under your hands, as successful, amputation at the ankle-joint, and its effects, will prove the greatest blessing to the human race, especially those unfortunates so afflicted.—I am, my dear Sir, yours most faithfully,

"THOS. AITCHISON."

Encouraged by this result, I soon afterwards operated in the same way on a gentleman of high scientific character in this

city, who laboured under extensive disease of the ankle-joint, and did not appear able to bear amputation of the leg with the slightest chance of recovery on account of the extreme exhaustion to which he had been reduced. He made a good recovery, and has thus reported on the state of his limb,—

"Edinburgh, *9th June* 1846.

"Dear Sir,—You will remember that I lost my foot in January 1843. The stump healed rapidly, and in six weeks had all closed, except one small aperture, from which a slight watery discharge continued to come till the month of June, when it suddenly ceased, and complete cicatrization occurred. Since that period, I have experienced no pain or uneasy sensation of any kind in the stump, nor any tenderness, making standing or walking irksome or unpleasant. I have very rarely experienced the feeling of the lost foot being still part of the body and the seat of pain, which is so common a complaint among those who have been deprived of limbs. For the last two years, I am not aware that I have known this sensation at all; if I have, it has made no impression on my memory. I can lean the weight of my body on the naked stump without inconvenience; and, with a single stocking over it, am in the habit of walking through the house when my boot is not at hand.

"The artificial foot I wear, within an ordinary half-boot, is made of light wood, with a spring across the part corresponding to the roots of the toes. This spring, however, is of no use, as the rigidity of the boot enclosing it prevents its acting. The foot might as well be made of one piece of wood. At the heel it is hollowed into a concavity, corresponding to the shape of the stump, but rising up before and behind into two prolongations, which, seen in section, would resemble the horns of a crescent. The foot is cased in shamois leather, which is carried up from the borders of the concavity, and cut into the shape of the upper part of a lady's cloth boot. Like it, also, it is laced up the inner side, and has a tongue: the latter is made of thick soft leather, and is of much service in securing the fitting of the foot. There are no straps or buckles, or steel supports of any kind, nor are they needed. From the bulbous form of the stump, and its circumference being considerably greater than that of the leg above it, the lacing of the upper leather completely suffices to hold the artificial foot on.



It would be impossible, indeed, to pull it off without loosening the lace or tearing the leather.

"The artificial foot, as originally furnished, was thickly padded; but I found the padding so apt to shift, and so liable to become uncomfortable from saturation with moisture, that I had it all removed. It is much more convenient to pad the stump, by covering it with two or more worsted or shamoy leather stockings, which can be changed at pleasure. I use a stick in walking; but, except on rough causeways or very uneven ground, it is unnecessary, neither is it requisite in ascending or descending stairs.

"The results of an inflammatory attack of the lungs make me a bad walker, nor have I ever ascertained how long a pedestrian journey I could achieve; but I have stood for six hours (not consecutively) daily, for months together, without any inconvenience, and I wear the artificial foot, without intermission, from morning till bed-time. Very sincerely," &c.

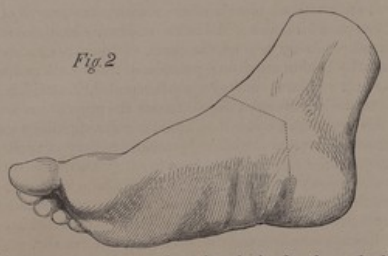
Soon after this I was asked by Dr. Shand of Kirkcudbright to see a gentleman in his neighbourhood who suffered from caries of the foot, complicated with great disorder and depravation of the general health. I proposed amputation at the ankle as attended with less danger than removal of the leg, and performed it with success. Thus acquiring increased confidence in the operation, I employed it in a great variety of cases, of which may be mentioned, an erectile tumour of the foot in an infant six months of age, a malignant growth of the foot, compound fracture of the ankle, and caries in all the situations which, being beyond the reach of Chopart's operation, are usually held to require amputation of the leg. The results being still uniformly and entirely favourable, I considered it my duty to impress upon the profession the propriety of adopting this operation; and notwithstanding the opposition which all innovations upon established practice are apt to experience, I have now the satisfaction of knowing that, both at home and abroad, amputation at the ankle is already in general use. Dr. Shuh, the distinguished professor of surgery of Vienna, who lately honoured Edinburgh with a visit, expressed his belief that it was now performed in every town of Germany.

When the operation is to be performed, pressure should be made on the tibial arteries by the finger of an assistant, or a

tourniquet applied above the ankle. The only instruments required are a knife, of which the blade should not exceed four inches in length, and a saw. The foot being held at a right angle to the leg, the point of the knife is introduced immediately below the malcolar projection of the fibula, rather nearer its posterior than anterior edge, and then carried straight across the bone to the inner side of the ankle, where it terminates at the point *exactly opposite* its commencement. The extremities of the incision thus formed are then joined by another passing in front of the joint.

*Fig. 1*

*Fig. 2*



The operator next proceeds to detach the flap from the bone, and for this purpose, having placed the fingers of his left hand



over the prominence of the *os calcis*, and inserted the point of his thumb between the edges of the plantar incision, guides the knife between the bone and nail of the thumb, taking great care to cut parallel with the bone, and to avoid scoring or laceration of the integuments. He then opens the joint in front, carries his knife outwards and downwards on each side of the astragalus, so as to divide the lateral ligaments, and thus completes the disarticulation. Lastly, the knife is carried round the extremities of the tibia and fibula, so as to afford room for applying the saw, by means of which the articular projections are removed, together with the thin connecting slice of bone covered by cartilage. The vessels being then tied, and the edges of the wound stitched together, a piece of wet lint is applied lightly over the stump, without any bandage, so as to avoid the risk of undue pressure in the event of the cavity becoming distended with blood, which would be apt to occasion sloughing of the flap. When recovery is completed, the stump has a bulbous form, from the thick cushion of dense textures that cover the heel, and readily admits of being fitted with a boot.

The advantages which I originally anticipated from this operation were—*first*, the formation of a more useful support for the body than could be obtained from any form of amputation of the leg; and, *secondly*, the diminution of risk to the patient's life, from the smaller amount of mutilation, the cutting of arterial branches instead of trunks, the leaving entire the medullary hollow and membrane, and the exposure of cancellated bone, which is not liable to exfoliate like the dense osseous substance of the shaft. From my own experience, amounting to upwards of fifty cases, and that of many other practitioners who have adopted amputation at the ankle, I now feel warranted to state that these favourable expectations have been fully realized, and that, in addition to its other advantages, this operation may be regarded as almost entirely free from danger to life.

The objections which have been alleged against the operation are, its extreme difficulty, and the risk of the flap sloughing. But, with all deference to the authors of these allegations, I do not hesitate to say, that, in so far as well founded, they should be attributed to the operator, and not to the operation. In the Royal Infirmary of Edinburgh, this disarticulation is

completed without the slightest hurry, in less than a minute, and if the flap is not scored or lacerated, or made too long, there is no chance of its sloughing.

### *Amputation of the Leg.*

The circumstances which were formerly held to require removal of the leg so generally admit of relief through amputation at the ankle, that the former operation is now rarely necessary in practice. Indeed, I have of late years performed it chiefly for the remedy of useless or uncomfortable stumps, resulting from amputation by flap at the middle or higher part of the leg. There can be no doubt that in these situations the flap method is very apt to leave a mass of redundant matter, affording no protection to the bone, which, having nothing to cover it except an imperfect cicatrix, is a perpetual source of discomfort and suffering. In order to prevent the risk of such unpleasant occurrences, and also to afford relief from them when they have unfortunately taken place, I think amputation of the leg should always be performed on the following principles.

In the first place, it does not seem desirable for any useful purpose to retain a longer stump than when the tibia is divided at the distance of an inch below the tuberosity, and as the cancellated texture of this part is less prone to exfoliation than the dense substance of the shaft, it is therefore improper to operate lower in the limb. Secondly, since a covering of muscle is not essential to the formation of a good stump, as may be seen from the results of amputation at the ankle; and since the attempt to retain a muscular cushion below the knee is, as has just been mentioned, apt to leave the bone in an exposed state, the operation should be so conducted as to make sure of obtaining a sufficient protection from the integuments. On the whole, I believe from ample experience, that the following mode of procedure, founded upon these principles, is the most eligible that can be adopted.

A tourniquet having been applied above the knee, two semilunar incisions are to be made through the skin, from side to side of the limb, with their convexities downwards, and their extremities meeting about two inches below the tuberosity of the tibia. The flaps thus formed are then to be detached



from their subjacent connexions, so as to expose the bones at the distance of an inch below the tuberosity. The muscles are next divided behind about the middle of the extent to which their surface has been exposed, and then before the interosseous ligament on a level with the line where the saw is to be applied. Allowance having thus been made for the unequal retraction of the anterior and posterior muscles, the surface of flesh and bone presented after the operation is perfectly even, and admits of being covered by the flaps of integument without either straining or redundance.

The stump thus formed may either be rested on the skin, or employed so as to retain the use of the joint, by means of an apparatus consisting of a hollow cone secured by straps buckled round the knee.

### *Amputation at the Knee.*

The advantages which had been experienced in amputating at the ankle from the cancellated texture of the bone exposed not being liable to exfoliation, and from the medullary canal of the shaft not being opened, suggested to me the expediency of operating for disease requiring removal of the knee-joint by sawing through the condyles of the thigh-bone, and securing an adequate covering of soft parts by forming a short anterior and long posterior flap. The results of this procedure in my own practice, and that of various surgeons who have adopted it, are very encouraging; and if the choice in such cases lay merely between amputating at the knee and doing so at the middle of the thigh, I should feel inclined to maintain the importance of the former operation. But having for some years past been satisfied that amputation admits of being performed immediately above the knee, so as to provide a stump fully more convenient for the patient than when it is of greater length, I think this method should in general be preferred when practicable. In a letter lately received from my friend and former pupil, Dr. Charles Campbell of Jamaica, he says,—"It is admirably adapted to the cases of chronic ulcer of the leg, so common among the negroes, in which the skin and cellular tissue become enormously hypertrophoid, and the muscles undergo fatty degeneration. In such cases, a good flap is

always readily formed from the ham, and the resulting stump is, I think, superior to any that can be formed in the thigh. I have had occasion to operate in seven or eight cases, and have always been satisfied with the results." It thus appears that there may be peculiar conditions making this mode of amputation eligible.

### *Amputation of the Thigh.*

The unqualified preference for the flap method in amputating the thigh which I formerly expressed, has been considerably modified through the experience of more extended observation. I still think that when the limb requires removal at the middle or any higher point of the thigh-bone, the operation should be performed by the formation of two flaps, one being anterior and the other posterior. But when circumstances permit amputation at the lower third of the limb, and especially if it be muscular, I am fully satisfied that great advantage results from operating by circular incision, or, in other words, by providing a covering of integuments for the bone, instead of the muscular cushion which in this situation is so apt to retract and leave it exposed.

The incision through the skin should not be *circular*, but describe two semilunar lines from side to side, with the convexity towards the knee. The integuments having been separated from their subjacent connexions, and retracted to the extent of at least two inches, the muscles are to be divided as high as they are exposed in front, and as low behind so as to compensate for the inequality of retraction. The bone is then to be exposed at least two inches higher than where it has been brought into view by the anterior incision, and divided there while the muscles are carefully held up by a linen or leather retractor.

If the limb is not muscular, but soft or relaxed, as after protracted illness, or in females and children, the process may be conducted more simply and with much the same effect by making two short flaps, extending through both the skin and muscles, and then exposing the bone with great care, to let the saw be applied sufficiently high to prevent any risk of the extremity being subsequently protruded.



## EXCISION OF JOINTS.

More extended experience has confirmed my conviction, that the shoulder and elbow-joints are the only articulations which admit of excision with advantage for caries. Indeed the cases favourable for successful treatment of the former are so very rare, that the operation practically may be considered as limited to the latter situation. I have now operated on the elbow upwards of ninety times, and with results almost uniformly of the most gratifying kind—the recovery being speedy, and the limb hardly, if at all, impaired in mobility or strength. My last patient, although at the advanced age of sixty-six, recovered quickly, without a bad symptom. In regard to the operation, I have nothing to add, except in warning against deviating from the procedure which ample experience has ascertained to be the most eligible, whether the facility of execution, or perfection of the result, is the ground of judgment. During my incumbency at University College Hospital, I had under my care a case in which Mr. Liston had operated in the way recommended by him, and felt much regret for the effect being so much less satisfactory than might have been expected, if an operator so able had adopted a different method.

Excision of the elbow-joint has been lately extended to a field where it promises to prove very advantageous—I mean the remedy of anchylosis, and the permanent displacement of articulating surfaces consequent upon dislocation or fracture. The elbow is peculiarly liable to such derangements; and when rendered stiff by them—especially if maintained in the extended position—becomes nearly useless to the patient, who is always very desirous of relief. It was the case of a young man, whose arms were both in this state, and who was consequently in the most helpless condition that can be well imagined, which induced me to try the effect of cutting out the extremities of the bone, not on account of disease, but for the removal of their morbid adhesions. The operation is much more difficult than when performed for caries; and in order to be completely successful, requires a very free ablation of the bone concerned; but when properly executed, renders the limb nearly perfect in regard to motion and strength.

Acting upon the same principle, I lately operated upon a lady whose hand had the metacarpal bone of her thumb dislocated into the palm of the hand, where its carpal extremity formed a projecting knob. In this state she had remained for eighteen years, the thumb being bent back, so as to be unable to co-operate with the fingers, which were consequently of little use. Having exposed the head of the bone, and detached it by cutting pliers, I found no difficulty in placing the thumb in its proper position, where it remains, presenting a perfectly natural appearance, and gradually regaining mobility. The wound healed without any trouble.

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## BURSAL SWELLING OF THE WRIST AND PALM OF THE HAND.

The bursal sheaths, which accompany the flexor tendons of the fingers from the fore-arm into the hand, are liable to thickening of their texture, with distension, from effusion of fluid and the formation of moveable bodies, apparently composed of indurated lymph. Although this condition does not materially differ from that of other bursal sacs, which, when so deranged, yield without much difficulty to remedial treatment, it has proved peculiarly obstinate under the means of remedy formerly in use, and indeed was regarded as nearly, if not altogether, incurable. Blisters, and similar applications, produced little or no beneficial effect, and puncturing the tumours where most prominent in the wrist or palm, afforded no permanent advantage, as the wounds either continued to discharge, or closed without obliteration of the cavity. The last patient treated thus in the Royal Infirmary, died from the protracted local and constitutional disturbance so excited; and this case led me to reflect seriously on the subject, in order to discover the cause of obstinacy, and devise a safer remedy.

The only peculiarity that I could discover, was the constriction caused by the annular ligament, above or below which the opening had always been made, and which might perhaps so interfere with the healing process, as to occasion the obstinacy in question. In this view of the matter, it appeared that the proper site for an incision was at and through the ligamentous arch itself. I took the earliest opportunity of trying the



effect of such a procedure, which was so satisfactory as at once to establish the operation. Its results in my own practice, and that of others, have, so far as I know, been uniformly successful.

The easiest mode of operation is to puncture the swelling a little above or below the annular ligament, then introduce a blunt-pointed curved bistoury under the arch, and, lastly, divide it together with the superjacent integuments. Light and superficial dressing are sufficient in the first instance; and if the swelling does not speedily subside, one or two blisters may be applied.

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## PARACENTESIS THORACIS.

A great improvement has been introduced into the evacuation of fluid contained in the cavity of the pleura by substituting for the incision and tube or large trocar, formerly employed on such occasions, a very small instrument of the last mentioned kind, which is at once thrust through the parietes of the chest, and allows the pent-up matter to escape in a slender stream, or only by drops. There is thus no risk of any bad consequences, so that, if the patient's case does not admit of improvement, it is at least rendered no worse, while many instances of complete success might be quoted. One patient who was under my care had nearly 600 ounces of fluid removed at different times, without once being subjected to a day's confinement, and afterwards enjoyed such good health as to enter into the married state.

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## CYSTS OF THE MAMMA.

When the tumour depends upon a single cyst the treatment recommended by Sir B. Brodie may be adopted. It consists of evacuating the fluid by a small puncture, and applying a stimulating embrocation on the surface, with the view of counteracting the tendency to effusion. Troublesome consequences are apt to result from this procedure when the puncture is effected by means of a lancet, or any similar instrument.

But I have never encountered any such result when a small trocar was employed for the purpose.

## HERNIA.

### *Internal Hernia.*

By internal hernia is understood a constriction of the bowels caused either by fibrous bands resulting from adhesion of the neighbouring parts, as by the neck of a peritoneal sac lying within the abdomen. In the former of these conditions operative interference, though occasionally attempted, does not seem to be warrantable on account of the obscurity which must prevent the diagnosis from ever being quite certain, the difficulty of disentangling the intestine—often a tedious and operose process, even in the dead body—and the extreme danger resulting from such exposure, handling, and cutting of the viscera. Even in circumstances apparently the most desperate, the chance of spontaneous recovery must exceed that of escape from the effects of an operation attended with so much risk, and so little promise of success.

In the other form of the disease, which may more correctly be denominated Internal Hernia, the case is very different, the seat of constriction being the neck of a sac, which may be distinctly recognised and is safely accessible. This sac is formed by protrusion of the peritoneum through one of the apertures of the abdominal parietes, which constitute the ordinary seat of hernia, more especially that of the inguinal canal, and produces the effect in question by having been reduced into the abdomen together with the portion of intestine contained in it. In one case that came under my care, the sac had not been protruded for many months previous to the symptoms of strangulation, and therefore may perhaps have for some time existed in an empty state. But in general the reduction takes place during the period of strangulation, and is effected by external pressure employed for the taxis. The diagnosis is therefore rendered distinct by the symptoms persisting after the tumour disappears, and may usually be confirmed by carefully examining the seat of protrusion where a sense of fulness or resistance is perceived when pressure is made over the internal tumour.



When the history of the case and the existing symptoms afford ground for believing that the sac has been reduced, together with its strangulated contents, no time should be lost in affording relief. For this purpose, a free incision having been made, so as to expose the spermatic cord, the operator introduces his finger through the external ring under the tendinous expansion of the external oblique muscle, and divides it directly upwards with a blunt-pointed bistoury, to the extent of an inch or more, if necessary, to bring the bottom of the sac into view. It generally then protrudes, and admits of being treated as in ordinary cases of hernia. But, if it does not do so, even when the patient coughs, may be readily seized with forceps and drawn fairly into view. In the case above alluded to, where the strangulation had taken place within the abdomen, I found no difficulty in executing the process as just described, and with complete success. It is matter of much regret that this mode of relief has been adopted in a comparatively small proportion of the cases requiring it which have hitherto occurred, and in general at a period of the disease so advanced as to preclude any chance of recovery. But the attention which has of late years been devoted to the subject will, it is hoped, render the practice in future more satisfactory and creditable to the art of surgery.

### *Division of the Stricture without opening the Sac.*

The late Mr. Aston Key and Mr. Luke of London have done much to revive and establish in practice an old proposal for lessening the risk of operations for hernia, by dividing the cause of constriction without opening the extension of peritoneum which constitutes the sac. The advantage attributed to this procedure is that which may be supposed to result from leaving the serous membrane entire, and in protecting it from the risk of inflammation, while the disadvantages alleged to attend it are the dangers of wounding the intestine in dividing the stricture, the evils which may arise from reducing the strangulated parts in a state unfit for their admission, and the mischief which may arise from abortive efforts to effect reduction when it is impeded by adhesion, or other change of the parts contained within the sac. On the whole, I feel satisfied that, as a general rule, it is better to open the sac, and that the procedure in

question should be restricted to the treatment of large hernial protrusions such as those of the scrotum, and of patients in unhealthy hospitals, where a strong disposition to inflammation of the serous membrane may be inferred from the frequency of erysipelas and phlebitis.

## STRICTURE OF THE URETHRA.

I still regard dilatation by simple bougies as the best means of treating stricture of the urethra in its ordinary form, and still adhere to the disapprobation formerly expressed with respect to the use of caustic, and internal incision of the urethra by lancetted catheters. But nearly ten years have now elapsed since I became satisfied that certain cases of the disease did not admit of remedy by dilatation, and required division of the contracted part of the canal. At the same time, I became satisfied that there were no strictures truly impermeable; and that any urethra which allowed the urine to pass through it, could by proper care be made to admit the entrance of instruments. It is therefore requisite that these two points should now be fully explained.

There are two forms of stricture in which the bougie has been found inadequate to afford relief. In one of these the canal, especially at the seat of contraction, is so extremely irritable, that even the most gentle use of instruments gives rise to violent and dangerous disturbance of the system, with rigors followed by fever, and frequently local inflammation. The patient, exhausted by such efforts, dreads their repetition; and successive practitioners, finding their most careful efforts lead only to the same results, any farther attempts to afford relief are at length deemed inexpedient, and the disease is allowed to pursue its course, until a fatal retention of urine, or some equally fatal operation, undertaken to prevent extravasation, terminates the complicated sufferings of such a case. In the other form of stricture which resists the ordinary means of treatment, there is an extreme degree of resiliency and tendency to contract after dilatation, so that only the most evanescent relief can be obtained through the means employed for this purpose. It may be added, that in both of these obstinate forms, the symptoms of the disease are, in general, peculiarly distressing, the urine being not only expelled with great difficulty by drops, or the smallest of thread-like streams, but also very imperfectly retained, dribbling away involuntarily by day as well as night, and causing the utmost discomfort, by its effects on the patient's clothes and skin, exposed to the acrid moisture.



In 1844, I felt great pleasure in communicating to the profession a mode of remedy, which had afforded complete and permanent relief in a case of obstinate stricture, than which it was impossible to imagine one more distressing, or more hopeless, under any other known means of treatment. In 1849, encouraged by farther experience, I published a treatise on the treatment of stricture, with the view of explaining and recommending this method, and since that time have related a great many additional cases illustrative of its effects. For more particular details I may refer to these sources of information, it being sufficient at present to render the principles of practice distinctly intelligible.

It is well known that there are certain textures, healthy as well as morbid, which cannot be expanded without pain and the risk of inflammation, but may be divided by incision with ease and safety. Spasmodic stricture of the anus, and the ring at the base of the prostate, which cannot be torn without the production of fatal effects, afford examples of this kind, and illustrate the advantage of cutting, under certain circumstances, instead of dilatation. In strictures of the urethra which exhibit the irritable and unyielding or resilient characters, it therefore seems reasonable to expect advantage from dividing them freely by means of a cutting instrument, instead of persevering in vain and hazardous efforts to dilate the contracted part by bougies. Attempts to accomplish this, by introducing sheathed blades into the canal, and also by cutting from without upon the point of an instrument carried down to the seat of obstruction, had been frequently made with a different view, viz., overcoming resistance which was supposed to render the canal impermeable, but with very unsatisfactory results, from imperfect attainment of the object, extravasation of urine, and hæmorrhage caused through the want of a safe guide for the knife. In the operation which I proposed, the first and essential step was to introduce a grooved director fairly through the stricture, so

that complete division of the whole thickened texture might be effected with certainty, and with security from any lateral aberration, endangering the artery of the bulb or other arterial branches, the mesial plane of the perineum, which corresponds with the raphe, being free from vessels of the slightest consequence.

But if stricture were not unfrequently impermeable, this method must have been limited in its employment, and incapable of affording relief in those cases which chiefly required it; and therefore, so long back as 1844, I expressed my persuasion that no stricture was truly impermeable, the exit of water being a certain sign that instruments might, through sufficient care, be introduced. This principle of practice was obviously of great importance, since conviction of its truth would obviously lead to much more prolonged and careful exploration of the passage than would be thought requisite, if belief in the existence of impermeability was entertained. For my own part it was frankly confessed that while sharing in the doctrine of impervious urethras, I had occasionally found them so, and performed the old operation, while ever since adopting the principle that every stricture might be permeated by instruments through time and care, I had not, either in public or private practice, met with one that proved incorrigibly obstinate. To this statement it was replied in London, that cases of impermeable stricture, requiring the old operations, were *constantly* occurring in the metropolitan hospitals, and that my observations consequently must have been founded upon examples of the disease in a less aggravated condition. Having practised for some months in London, and treated both publicly and privately not a few cases of stricture previously deemed impermeable, I felt assured that this allegation was not well-founded, and knowing that my mere assertion to the contrary might not counteract the effect of it in impeding the adoption of what seemed to me a most important principle of practice, I made a proposal which, whether accepted or declined, should remove all doubt upon the subject. This was to pay the expenses, down and up, of any patients sent to my care from the London hospitals as labouring under impermeable stricture, and treat them publicly in the clinical wards of the Royal Infirmary. As this offer, which was made in perfectly good faith, and which I still hold binding upon me, has been industriously



misrepresented as a boastful "challenge," I think the circumstances which suggested it should be fully understood.

In performing the operation the only instruments required are a short, straight, sharp-pointed bistoury, a grooved director, the size of a No. 1 bougie, and a No. 7 silver catheter. The patient under the influence of chloroform, if he pleases, being placed with his back upon a bed or table, and his limbs held up so as to expose the perineum conveniently for the purpose in view, the operator introduces the director, confides it to an assistant, and makes an incision over the stricture about an inch and a quarter in length, exactly in the central line or raphe. This incision should at once extend through the skin; subjacent cellular texture, and fascia, and be afterwards deepened if necessary, great care being taken to cut precisely in the same plane, and especially to avoid going aside beyond the director. The operator, having felt the instrument distinctly, takes it in his left hand, and guarding the knife on his right fore finger, inserts its point into the groove, on the bladder side of the stricture. He then urges the blade forward through the thickened and indurated urethra, which, from its toughness and yielding disposition, is apt to elude the knife, and next, having withdrawn the director, passes the catheter into the bladder, where it must be secured by proper tapes, and a bandage round the loins. If the case is complicated with fistula, or much thickening of the perineum, the process may be facilitated by making the first incision a few days before the operation, and applying poultices in the interval, as the urethra is in this way rendered much more accessible. The catheter may be removed on the second day, and if rigors, vomiting, quick pulse, or other feverish symptoms should occur during the subsequent twenty-four hours, they may be safely attributed to a temporary effect on the nervous system, produced by the urine resuming its natural channel. They require no treatment, lead to no bad consequences, and quickly disappear. The urine sometimes passes at once entirely by the urethra, but more frequently issues in part through the wound for a week or two.

In originally recommending this operation, I stated my expectation that it would prove safe, speedy, and effectual. I have now performed it fifty-three times, without the loss of a single patient, or the slightest alarm from either hæmorrhage or extravasation of urine. And in every instance the symptoms

of stricture have been completely removed before the end of forty-eight hours. With regard to the duration of effect, I knew that it had proved permanent, and hoped that it would always do so; but as the determination of this point required long and careful observation, I did not consider myself warranted to withold the knowledge of a practical improvement merely because the full amount of advantage to be derived from it had not been ascertained. The proposal was *for the remedy of strictures otherwise irremediable;* and whether the means employed for this purpose should prove sufficient for preventing relapses, or whether the ordinary precautions of passing bougies after the cure by dilatation should still prove requisite, seemed questions apparently of very secondary consequence. Yet, strange as it will doubtless some day appear, the whole periodical medical press of England and Ireland, with the single exception of the British and Foreign Quarterly Review, while studiously withholding the slightest credit for accomplishing the removal of what has long been regarded as one of the greatest opprobriums of surgery, have attempted to overwhelm me with abuse, because one or two of my patients, whether from the operation being imperfectly performed, through want of experience in the earlier cases, or from omitting the use of bougies when there was a strong tendency to subsequent contraction, have suffered from a return of their complaint. How far, in pursuing such a course, these publications have promoted the relief of suffering, and encouraged the progress of surgery, will be determined by time, and to the decision of this infallible judge I confidently appeal.

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## LITHOTOMY AND LITHOTRITY.

Great improvements have been made in the instruments employed for crushing stones in the bladder, attended with a corresponding degree of facility and success in their employment. The operation may now be conducted with propriety by any practitioner who is accustomed to manipulate the urethra and bladder, and when the stone is not so large as to require frequent repetition of the process, it may be removed in this way with wonderfully little disturbance to the patient. But if there is any prospect of a prolonged and laborious conflict with the



fragments, it is much better to extract the concretion entire, through incision, than to incur the danger of exciting chronic inflammation of the bladder, which is attended with much more suffering than the mere presence of a stone.

The crushing instruments must not be introduced when the bladder is empty, as its coats could then hardly escape injury; but it is not expedient to inject water for the purpose of distension, as it is apt to escape by exciting the contractile effort of expulsion. A better plan is to allow accumulation of the urine to the requisite extent, since there is then less tendency to evacuation, while the capacity of retention affords the best evidence of the organ being sufficiently free from irritability to warrant the operation. Chloroform should not be administered, since pain is a sure sign of some error in the procedure, and therefore, if prevented from being manifested, can no longer act as a useful beacon to the operator. The patient should be placed on his back, with the pelvis raised by a firm pillow, so as to let the stone lie, not at the neck, but in the posterior fundus of the bladder. In searching for the concretion or its fragments, the instrument should not be moved about at random with expanded jaws, but be carefully conveyed to the side of the body which it is desired to seize, and then having one blade elevated, while the other remains in its place, be fairly turned round and closed upon the stone. It is impossible to explain any more in this than other operations, all the minutiæ of manipulation which are requisite for its successful performance. Practical experience, and familiarity with the instruments employed, are essential for a perfect execution of the process, which is one of those that may be performed with advantage on the dead subject.

With regard to lithotomy, I have nothing to add except with respect to the extent of incision requisite through the prostate. Twenty years have now elapsed since I attempted to shew, by the result of careful trials on the dead bladder, that division of the gland, throughout its whole extent, affords space merely sufficient for the passage of a spherical body, not exceeding an inch and quarter in diameter, and, consequently, altogether inadequate for the extraction, by means of moderate sized forceps, of any stone large enough to warrant the operation. It is plain, therefore, that the space really obtained must be afforded either by stretching or tearing of the textures beyond the

base of the prostate, and it will be found that very slight force is required for overcoming the resistance of the mucous membrane, and muscular fasciculi of the vesical coats, which readily separate from each other. In the dilatation accomplished by the finger of the operator, it is thus that the wound is enlarged—the mucous membrane being stretched or torn, and the bundles of muscular fibres being drawn asunder. But if the resisting ring which exists at the base of the prostate be left entire, this process cannot be performed, and if force be employed to overcome the resistance thus produced, a fatal injury will most certainly be inflicted on the patient.

The late Mr. Liston, like other successful lithotomists, always cut this ring, but unfortunately expressed himself upon the subject so as to lead to a different conclusion. "The less that is cut, the greater will be the patient's safety," was his favourite maxim, and in the first three editions of his Practical Surgery, the only diagram given to illustrate the extent of prostatic incision, represents the base of the gland as left quite entire. Knowing how much confidence was reposed on the principle of an operator so distinguished, I had much correspondence with him in regard to the misleading influence of such an unqualified restriction against cutting to the extent which I believed essential for safety. I merely "*notch* the gland," was his constant statement, to which I replied, "very true, but it is the base which you notch and not the apex, as must be supposed from your diagram and accompanying direction." In the fourth edition of his work, Mr. Liston has given a supplemental paragraph and diagram which completely admit all that I had so long maintained, and thus remove a subject of discussion seriously perplexing to students of surgery.

In order to ensure the requisite extent of prostatic incision being duly executed, notwithstanding the patient's struggles and involuntary contractions of the *levator ani*, which are apt to withdraw the neck of the bladder beyond reach of the finger, so that the part to be cut cannot be either seen or felt, and therefore render anatomical skill of no use for accomplishing the object in view, I formerly thought it expedient to introduce a straight director through the wound of the perineum, and upon this convey a knife so fashioned as to make sure of dividing neither more nor less of the prostate than what was proper. It appears that this method was practised by



Le Dran, one of the most successful operators for stone, inasmuch as he is said never to have lost a patient. But all such contrivances have ceased to be requisite since the introduction of chloroform in the practice of surgery, as the patient being altogether unconscious during the operation, makes no involuntary efforts to impede its performance, and the prostate lying quietly in its proper place, is always within reach of the finger, so that the incision through it may be regulated with the utmost nicety.

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## HYDROCELE.

In recommending the tincture of iodine for the permanent recovery of hydrocele by injection, I have said that it may be used either alone or mixed with water; but I am now satisfied, by long and ample experience, that it should always be employed in the former way. From ℥j. to ℥ij. is quite sufficient for the purpose, and may be easily injected by means of the common pewter syringe, which readily admits of being fitted to the canula of the trocar by simple rotation of its nozzle within the tube. Of all the means which have been proposed for the cure of hydrocele, this certainly is the easiest, least painful, and most effectual.

The trocar may be protected from corrosion by washing it with sulphuric ether.

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## FUNGUS OF THE TESTICLE.

It has been long known that the fungous excrescence of the testicle, which is so frequent wherever mercury is given freely and indiscriminately in the treatment of venereal diseases, having no malignant disposition, may be remedied without removal of the entire organ. Mr. Lawrence, who, from his connexion with St. Bartholomew's Hospital, was doubtless very familiar with this disease in all its stages, many years ago pointed out its non-malignant character, and recommended repeated ablation of the fungus by cutting or caustic, until cicatrization was accomplished. But my colleague, Professor Goodsir, found, on examining under the microscope an excrescence of this kind which I had removed, that it consisted of

the tubular texture of the testicle expanded in the form of diverging rays, with newly organized substance occupying the interstitial spaces, and an investment of granulating pellicle covering the surface, and it is therefore obvious that the treatment of Mr. Lawrence could not be depended upon for relief, so long as any of the testicle remained unprotruded, so that, although the result might appear more creditable to surgery than if castration had been employed, the patient derived little advantage, since he parted with the testicle by instalments, instead of having it taken away at once, and endured a protracted, painful procedure, instead of one that was speedy and comparatively easy.

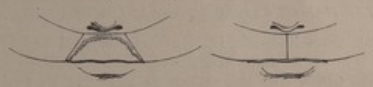
As the fungus, from its constitution, admitted of being considered similar to an extreme degree of exuberant granulation, it occurred to me that the disease might be induced by pressure to retrace its steps, and thus permit recovery without any loss of substance. For this purpose, nothing seemed so convenient as covering the growth with the scrotal integuments, which being freely separated by dissection from their subjacent connexions, could be readily brought over the tumour, so as to have their edges united by sutures. This experiment proved eminently successful, and has been followed by results in the practice of others, as well as myself, which warrant me to recommend the operation as in every respect deserving of confidence. It may now, through the agency of chloroform, be performed without pain. It is much more speedy in effecting recovery than any other method, and it preserves instead of destroying the organ concerned.

## RESTORATION OF THE LIPS.

It is difficult to imagine the inconvenience which proceeds from the absence of both lips, or even one of them, and especially the lower. In addition to the shocking deformity so produced, the indistinctness of articulation, the dribbling of saliva, the inability to masticate, and the pain occasioned by exposure of the teeth, render the patient's existence in the highest degree miserable. The remedy of these defects used to be considered almost hopeless, but of late years has been practised in Edinburgh with results of the most satisfactory kind.

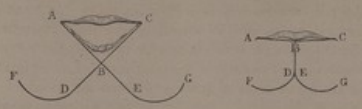


The upper lip seldom suffers from disease, and is most apt to be defective from a fault of original formation, or from the injury inflicted through fruitless efforts to unite the edges of such a "hare lip," in cases where attainment of the object in view is rendered more than usually difficult by width of the fissure. If the cheeks remain entire, a new lip may be easily formed by cutting on each side from the angle of the mouth outwards, with a slight inclination upwards, and again in a similar direction from the upper part of the lip, just below the *ala* of the nostril. The edges of the flaps thus formed, may be readily drawn together and united by pins in the middle line, while stitches of the interrupted suture maintain the cut edges in their new relation to each other, resulting from the lateral displacement to which they have been subjected. The edges of the skin and mucous membrane of the new lip, in so far as it enters into the formation of the mouth, should also be stitched together. If a half of the lip merely is deficient, the incisions will of course be required only on one side of the cheek.



The lower lip requires reparation much more frequently than the upper one, from its greater liability to disease, and the operations performed for its removal. Indeed there would be still more reason for such substitution, were it not for the difficulty experienced in its execution having rendered surgeons averse to operate when the lip required to be removed so extensively as to leave the teeth exposed. By the following operation the object may be attained easily, securely, and completely. I can now speak from the experience of seven cases, and therefore recommend it with confidence.

Supposing the concave line A B C to represent the gap requiring to be supplied, two straight incisions are made outwards and downwards from B to D and E, and then continued, in a curve direction, downwards, outwards, and upwards, to F and G. The flaps thus formed, are then to be separated from the jaw on each side, and raised so as to let the edges B D and E B unite together, and that of A B C come into a horizontal line.




A pin or needle should next be inserted at the edge of the lip, and another at its base, including the apex of the triangular portion of integument allowed to remain undisturbed over the chin, with a third between the other two. Stitches of the interrupted suture easily maintain the cut edges together, beyond the middle line in the relation to which they are brought through the extensibility of the texture concerned, so that no raw surface being left, union by the first intention is allowed to take place completely, generally permitting the patient to be shaved within a week after the operation.

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## REMOVAL OF CANCER BY THE CHLORIDE OF ZINC.

Many years have elapsed since the original proposal of chloride of zinc as an escharotic, and it is comparatively within a recent period that the advantages attending its use have been fully appreciated. The inefficiency, uncertainty, and danger of the agents previously employed for this purpose, which were the nitrate of silver, caustic potass, mineral acids, corrosive sublimate, and arsenic, had established a strong prejudice against their employment in modern surgery, which required time and experience for its removal. But now that the chloride of zinc has been fully recognised as one of the most valuable additions which this inventive age has contributed to the healing art, it is proper that the mode of application, and circumstances admitting of its employment, should be distinctly explained.

The chloride of zinc does not, like the lunar caustic, and most other agents of the same kind, act merely on the *surface* to which it is applied. On the contrary, it strikes deep into the texture concerned, and seems to have hardly any limit to its effect beyond the thickness of the mass applied, and the length of time it is allowed to remain in operation. There is consequently hardly any morbid growth, accessible to operative treatment,



which may not be regarded as within its reach; and patients who entertain an insuperable dread of the knife, have been relieved by it, under circumstances which would have rendered the easy and speedy process of excision much more expedient. But there are many cases of frequent occurrence in which the disease, though distinctly incurable, is not favourably situated for being cut out; as, for instance, cancerous sores upon the scalp and face, especially in old people, who are apt to suffer from erysipelas, and, in more general terms, all morbid parts of which the superficial extent is large in proportion to their depth. The chloride should be rendered fluid by the addition of a very small quantity of water, to assist its own extreme tendency to deliquescence, and then mixed with a sufficient quantity of wheat-flour, to form a consistent paste. This is applied on the part to be destroyed, and retained so long as may seem requisite. Poultices are employed until the slough separates, and afterwards the sore is treated as a healing surface.

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HOSPITALS FOR THE SICK.—When was the first hospital of this kind founded? So far as I am aware, there is no trace of any such institution in the classical writers. I shall feel thankful for reference to any works bearing on the subject.

CPL.

[We have never met with any work containing a connected historical account of these beneficent establishments. Bearing some resemblance to our present hospitals was the bath of Asclepius, a temple of the gods called Epidotæ, erected by Antoninus Pius at Epidaurus—a temple dedicated to Hygieia, Asclepius, and Apollo surnamed the Egyptian, and a building beyond the sacred enclosure for the reception of the dying, and of women in labour (*Paus.* ii. 27.) Epitaurus is also described by Strabo (viii. p. 374) as a place renowned for the cure of all diseases, always full of invalids, and containing votive tablets descriptive of the cures, as at Cos and Tricca. (Smith's *Dict. of Geography*, i. 841.)

Hospitals for the poor and sick, however, are pre-eminently characteristic of Christianity. In the first ages of the Church, the Bishop had immediate charge of all the poor, both sound and diseased. When the churches came to have fixed revenues allotted them, it was decreed, that at least one-fourth part thereof should go to the relief of the poor; and to provide for them the more commodiously, houses of charity were specially erected for the sick. So early as the Council of Nice, A.D. 325, hospitals for the sick are spoken of as commonly known. The first celebrated one was that of Cæsarea, A.D. 370-380, richly endowed by the Emperor Valens. After it followed the hospital of Chrysostom at Constantinople.

We learn from Jerome, that Fabiola, a wealthy Christian widow of a noble Roman family, who died in his time, first erected a public infirmary: "Prima omnium *xenodochium* instituit, in quo ægrotantes colligeret de plateis, et consumpta languoribus atque inedia miserorum membra foveret." (*Epist.* lxxvii. ed. Migné. Paris, 1845, tom. xxii. 694.) And Gregory the Presbyter, in his Life of Nazianzen, says, that Basil, who lived in the same age with Jerome, built a large hospital for lepers with charity money, which he collected for that purpose. (Seeker's *Sermons*, preached before the Governors of the London Hospital, Feb. 20, 1754.)

In early times no convent was without its tenement for the sick poor; but the first order which we find exclusively founded for hospitals are the Hospitalières, who follow the rule of St. Augustine, and were appointed to the care of the Hôtel Dieu at Paris. For an account of the Religious Orders in the Roman Catholic Church consult the *Encyclopédie Théologique*, par M. l'Abbaye Migne, and the *Histoire des Ordres Réligieux* par M. Herion.

Connected with this subject is the history of the various 'Spitals, such as St. Mary's 'Spital, near Bishopsgate; St. Bartholomew's 'Spital, Smithfield; St. Thomas's 'Spital, Southwark, and the New Abbey of Tower Hill, called "Our Lady of Grace." *Vide* Stow, Newcourt, and the numerous 'Spital Sermons. A list of works on the Hospitals of London is printed in the Catalogue of the Library of the Corporation of London, 1859, pp. 69-72. Mr. Murray, in 1850, published a useful little work on this subject, entitled *Hospitals and Sisterhoods*, 12mo. Consult also a valuable article in Rees's *Cyclopædia*, vol. xviii.]

PAMPHLETS

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