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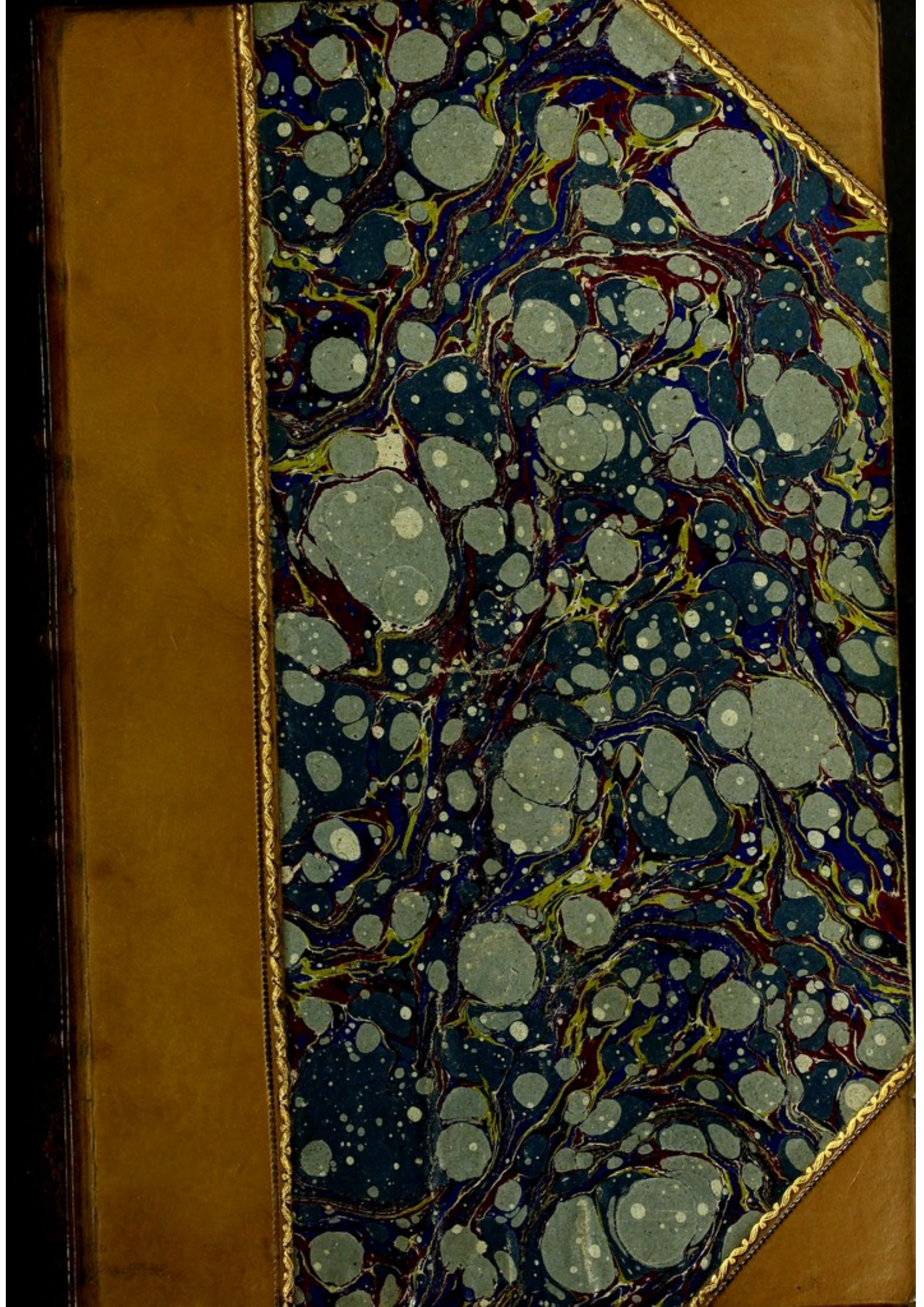

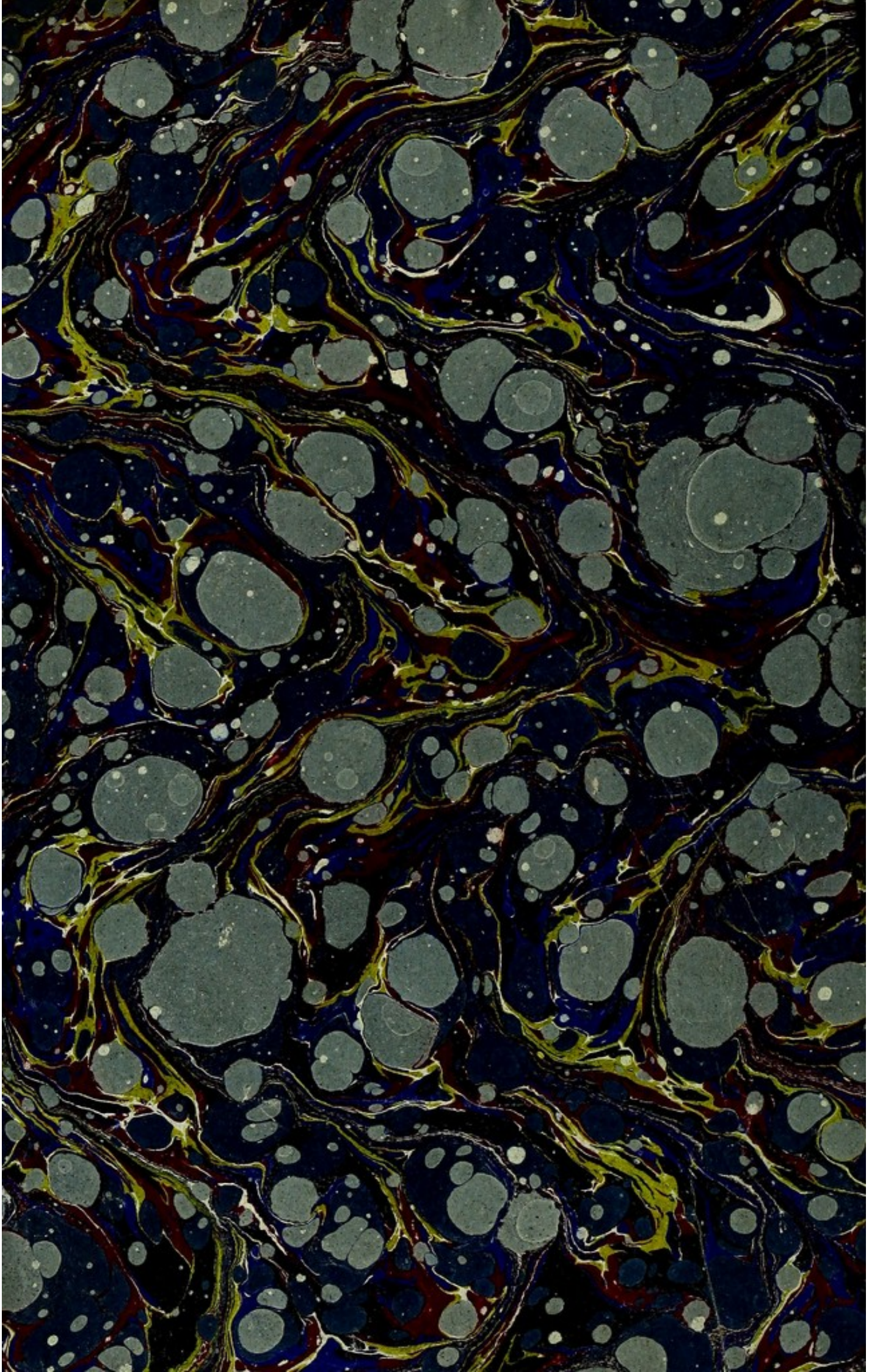

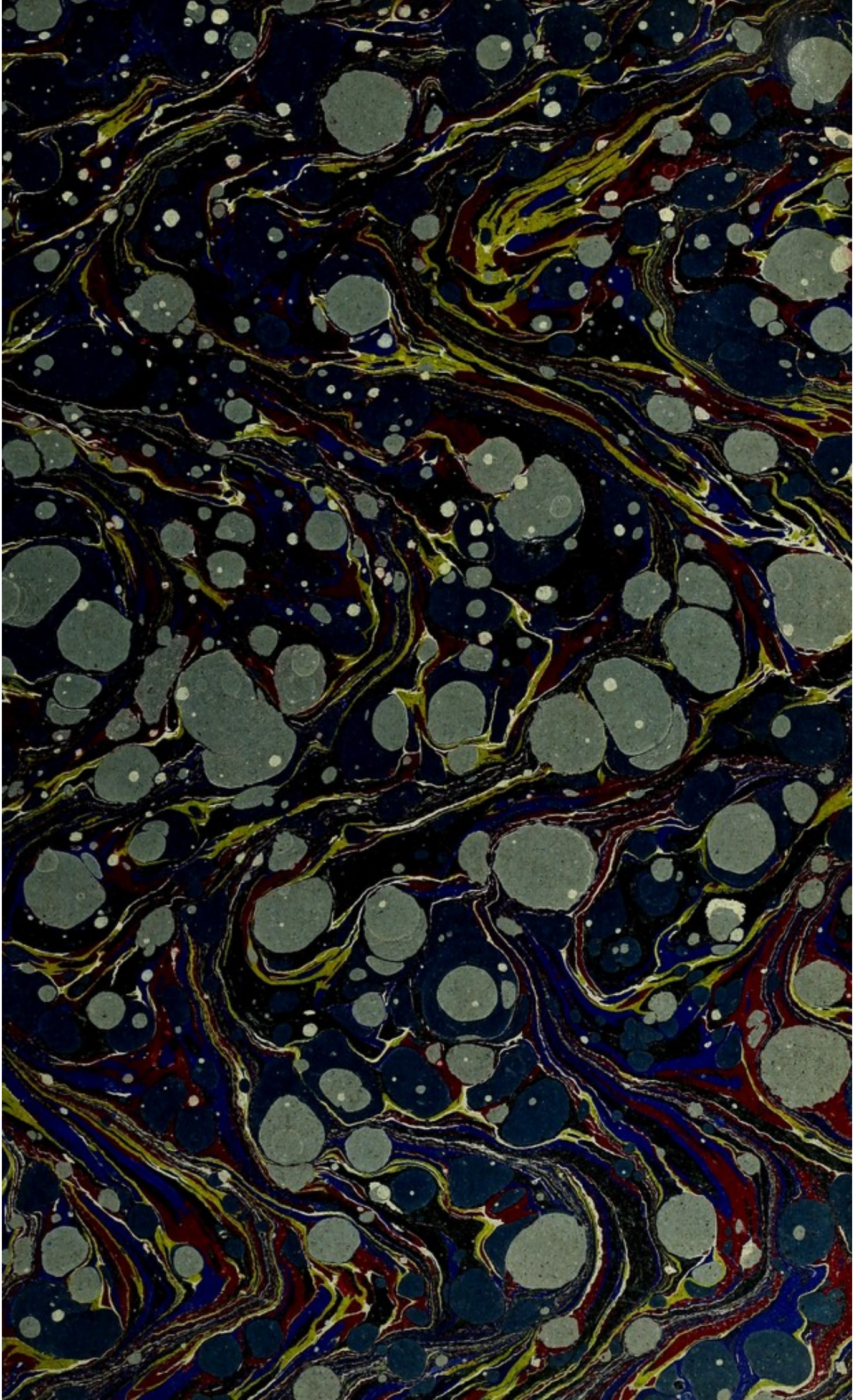

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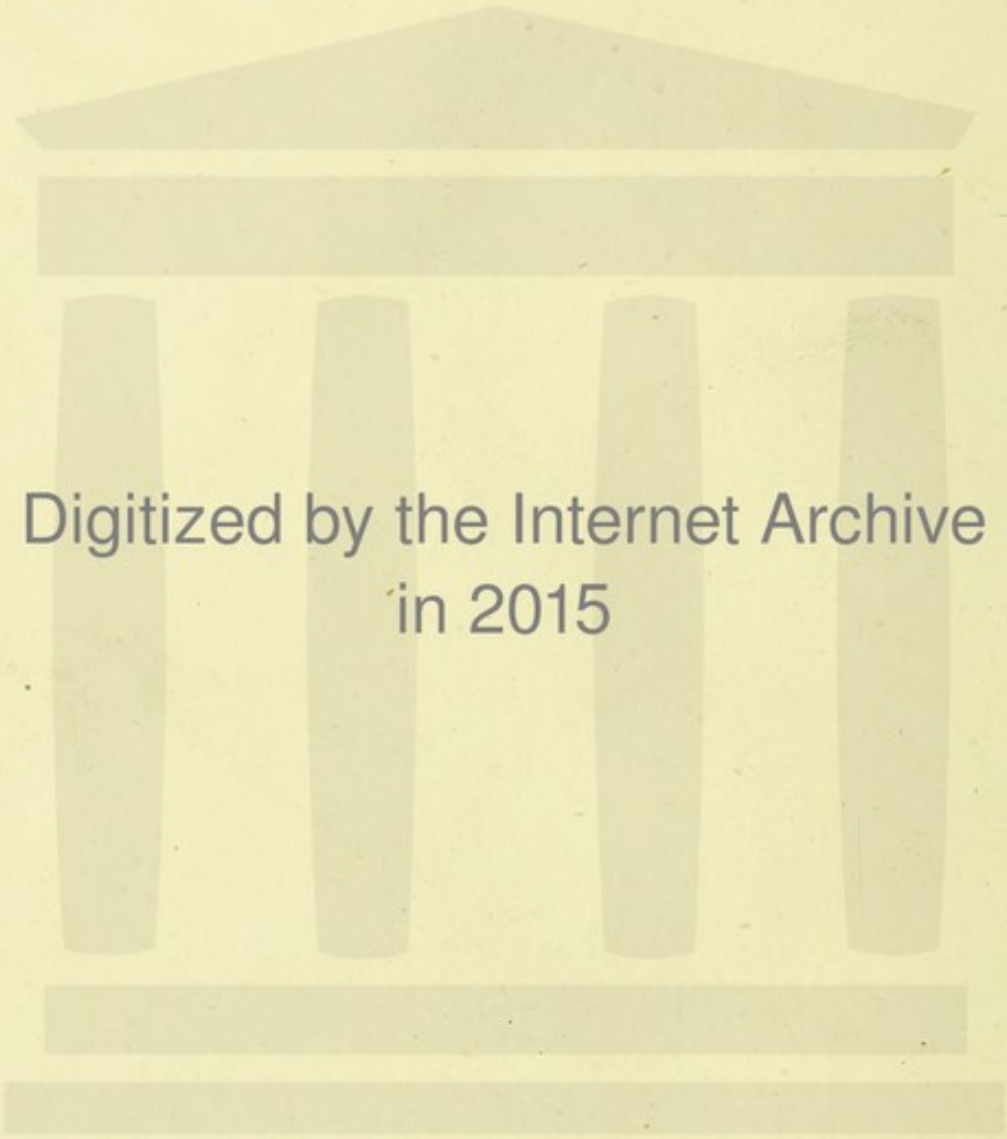

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CHAMBERS' LECTURES.

LECTURES:

CHIEFLY CLINICAL.

BY

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PREFACE

TO THE

THIRD EDITION.

In two former editions I named the selection of clinical observations which I laid before the public "The Renewal of Life," intending thereby to intimate what is more fully stated in the first and second introductory chapters, that the main point for the physician's consideration in disease is the deficiency of vital action, and that all successful medical treatment is a renewal of that vital action. To my regret the words have been found strangely "open to misrepresentation" by several of the literary men engaged in reviewing the work. Such a risk seems to outweigh the advantage of expressing in an epigrammatical form the principles advocated, and has led me to take the unusual course of leaving out a great part of the title. But I am more than ever impressed with the importance of these principles in practical therapeutics, and have enforced them anew by revising carefully the original matter, dovetailing into it many remarks made to my class

on recent passing cases, and adding twenty-three new lectures, three given at the College of Physicians, and the rest in my post as a teacher of medicine at St. Mary's Hospital.

The original first lecture was published as a field for the discussion of conflicting theories by those who did me the honour of criticism. That object having been attained, and answers given in a concluding essay, the greater part of it has been omitted, and the remains interpolated elsewhere.

It may be remarked that most of the "Lectures," as here presented to the reader, combine materials orally delivered at several, and often at distant, times. These are obviously short fragments of lectures, made still shorter by the omission of the elementary instruction on diagnosis. They are here united under subjects, and to avoid chronological confusion the dates of their *vivâ-voce* production are set at the head of each. I trust the disjointed aspect thus given will be pardoned, as we pardon, in a portfolio of sketches made on the spot, roughnesses inexcusable in the finished works of the studio.

T. K. C.

22B, BROOK STREET, GROSVENOR SQUARE;
May, 1864.

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LECTURE I.

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(*Introductory Clinicals, St. Mary's, October 4th,* 1861, *and October 2nd,* 1862.)

Before I enter, as a teacher of clinical medicine, upon my duty of showing you how to read the lessons which are spread out before your eyes in the hospital wards, it is my custom to give you an introductory lecture. I think this saves time in the end, for "*claudus in viâ antevertit cursorem extra viam,*" as Bacon tells us, and my object is to show you the way. Doubtless all your past professional studies have been in a manner introductory to this crowning study; your anatomy, and chemistry, and physiology, and the systematic principles of medicine learnt under me and my colleagues, have led up to this end. But I wish shortly to recall to your memory what points in

those studies of life and death have the most special bearing on the matter in hand, and to show how a consistent theory of therapeutics may be built up from them.

It is true that there are, and always have been, practitioners who declaim against theories altogether, who even boast that they can do without them, and think them useless, not considering that to express such scorn is as if we should be proud of not knowing what we do when we act, or what we say when we talk. To reason at all is to theorize; no one without theorizing can direct a method of cure to a sick person except at haphazard. As a matter of fact, none of these objectors ever do prescribe without theorizing about either the individual sufferer or the class to which they refer his sickness, though not always able to put their theory into words. In short, the want of a guiding principle to connect the loose facts of daily experience has at all times been felt.

From this practical need have been bred the many systems of therapeutics stamping their mark from time to time on the history of our art. They have sprung from the brains of working men at the bedside, not from philosophers in their closets. Their adopters have not necessarily any strong faith in their truth or universal applicability; but the heart wearies for a chain to link together the scattered fragments of knowledge—a string for its pearls; it must have an idea on which to codify the laws of action.

It would be a long task to quote the curious systems founded on imperfect data, but numbering their hosts of followers in former ages, which have been given up as false and dangerous; —I do not wish twice to slay the slain. I shall content myself with putting before you that which influences me in my practice, to which I now proceed.

Man's body may be likened to a stately mansion, made of beauteous but very perishable materials, all of which are always needing repairs to keep up the shapeliness and usefulness of the building. But not all in equal degrees; some of the walls may stand unaided for years, while other parts may want almost hourly looking after. When the owner leaves the dwelling the repairs cease, and then we see, not all at once, but one after another, the materials falling into ruin. It will serve a purpose

in my argument to think over the several steps of this ruin for a few minutes.

Already while the soul is withdrawing we know that changes begin, very obvious to even the most superficial observer. These changes are mostly due to the loss of water by evaporation. The eyeball loses its brilliancy and gets dry and flat, the features shrink, the gloss leaves the hair and skin. All this goes on all the more rapidly after decease, and then we hide our dead out of our sight, and the future fate of the body is less familiar to us; we must search for exceptional cases or special observations if we want to know what happens. These we may cull from sundry independent sources. Here is one which old barbarous manners afford us. "Rizpah the daughter of Aiah, the concubine of Saul," watched for six months, from "the beginning of barley-harvest" in April, to the rainy season in October, "till water dropped upon them out of heaven," to guard the corpses of her murdered kinsmen from the beasts of prey. So long under the sky of Palestine did they hold out a quarry for the wild dogs and vultures.

In a moister air decay is quicker, but still not so quick as is often supposed. Here is another observation redolent of the refinements of modern science. The notes made by M. Devergie * on the bodies at the Morgue at Paris, show that for two months and a half after decease the muscular structures still keep their natural forms and hues. Up to three months and a half, the scalp, eyelids, and nose so far retain their ordinary features that the age of the person may be told. It is four months and a half before complete destruction of the face occurs, or the bones become brittle, and the bulky muscles of the neck and thighs are converted into adipocere. So that we may call three months and a half a short time to be occupied by the decomposition of a human body. So long does flesh last as flesh, and tissue tissue, and is not melted into its mother earth.

Let us come forth quickly from these ghastly scenes of the charnel-house to the joyous bustle of brimming life, and ask how long it takes not a dead but a living body to decay? "A *living* body decay?" Yes, in truth; but whereas in the former

* Devergie, 'Médecine Légale,' t. ii, chap. 5.

case it was a thing to make men shudder, the fading of a long-loved image, the tearing up of a fair garment, the fall of a darling home, the violation of a worshipped shrine, the forcible divorce from our nearest and dearest—it is all this and more—in the latter it is associated with the fullest fruition of all that is joyous in existence, the bounding pulse, the free-drawn breath, the swelling chest, the thrilling feel of health, the highest uses of mind and body. Decay is more truly a part of life than it is of death; for it goes on unstayed through the whole of corporeal being; whereas, after dissolution, it gradually ceases, and ends its work with the re-conversion of the organic particles into eternally changeless elements. The most living body is the most active in decay: the more bodily and mental vigour are displayed, the more quickly do the various tissues melt down into substances which are without delay removed by the excreting organs. The more the blacksmith toils with his arms and the more the statesman with his brain, the heavier bulk of carbon, nitrogen, oxygen, and hydrogen is thrown out by lungs, liver, skin, and kidneys. Do they then wear out by this constant use, friction, and drain? No, no—the more bricks are removed from the old wall, the more new bricks will a good builder put in; and so—provided that the supply is sufficient, and that the builder is a good one—the more rapid the drain—the newer and stronger and fitter for its uses will the body become.

But I will leave generalities and try to represent in figures how long it takes by living decay for the living body to drain away, and to have its substance renewed. In the grim details which I recalled to your memory at the beginning of this lecture, the nitrogenous or fleshy parts were most accounted of and especially named as giving shape and the general look of a man to the melting corpse. So of the nitrogenous parts we will now speak—How long are they in being removed by vital decomposition?

We may reckon with Drs. Bidder and Schmidt* that the body of a mammal contains 35·45 grammes of nitrogen per kilogramme; and, therefore, that an animal of 130 lb. (which

* 'Die Verdauungssäfte und der Stoffwechsel,' p. 400.

is the mean weight of a man) contains upwards of 4·6 lb. of nitrogen.

Then again, taking our numbers from an equally sound and independent source, we may reckon with Baron Liebig* that the liquid and solid excreta of a man by kidneys and bowels for a year contain 16·41 lb. of nitrogen, or for three months and a half 4·7 lb. of nitrogen.

That is to say, in three months and a half a quantity of nitrogen is removed by excretion, or vital decay, equal to the quantity of nitrogen in the whole mass of the chief nitrogenous tissue.

What attractions has this term of three months and a half for us?—what memories does it rouse? Why, this was the very time we fixed upon for the fleshy framework of the corpse to melt away in. Here is a pregnant fact, a light thrown on the mysteries of nature from a most unpromising source! Dead flesh and living flesh last as nearly as possible the same time—the former, if anything, rather the longer. As far as we can judge, the albumen, fibrin, gelatin, &c., which make up the live body, differ in nowise from the same matters dead; they are liable to the same changes, affected by the same reagents, and naturally are resolved into their elements in the same time; just as the marble in the Apollo Belvidere is to a mineralogist the same stone as it was in the quarry, liable to the same accidents and possessed of the same properties, though temporarily endowed with a different value, and made god-like by its adventitious form.

What, then, raises to the rank of living creatures, and clothes with loveliness the masses of organic matter which are growing, moving, breathing, thinking, all around us? It is the power of the individual Life to create its own individual Form. A man has no right of property over the particles of his body, except so long as they remain particles of his body and retain his shape. He hardly calls *his* the snippings of his hair or the parings of his nails, much less the carbonic acid he exhales from his lungs or skin; all that he throws off is by common consent claimed as a perquisite by the public; and the battle-fields which he has

* Liebig's 'Chemistry of Agriculture and Physiology,' part i, chap. ix.

fertilised with his blood enrich, not him, but the peaceful farmer. Yet as long as these organic constituents retain the form impressed upon them by the individual life, they are more truly his than any portion of his inheritance.

A conjectural theory has been hazarded that Life mysteriously endows living matter with a defensive virtue, which enables it to resist the chemical and other powers acting regularly on inorganic and dead matter. The most notable instance cited is the stomach, which digesting everything else is not itself digested. This consumer of flesh is itself made of flesh, yet is not consumed. An answer seems given to the witty philosopher, who on hearing an alchemist boast his discovery of an universal solvent, inquired "In what vessel do you keep it?" The stomach says (it has been in the habit of saying wise things from the time of Menenius Agrippa), "In a vessel like me, which is destroyed indeed continuously, but is continuously rebuilt." Recent researches show that living matter, such as parts of living animals swallowed for instance, is dissolved by the gastric juice, and moreover that its own epithelial coat is destroyed, but is immediately replaced by a new one. By this activity of growth (the idea of the impudent members calling the belly lazy !), and by a constantly flowing supply of alkaline blood to neutralize any of the acid secretion which might penetrate too deep, it retains the same shape for threescore years and ten. But it has no privileged immunity against the solvent it makes.

It is, then, the Form which constitutes the Self; and it is not the changing, decaying matter which "was mine, is his, and may be slave to thousands." The organic materials are the property of the form only so long as it retains them, and no longer—they are a floating capital. Over the innate essential nature of the material it has no control. Life cannot make the brute materials which it uses live longer than that which it leaves unused, but it has the power of making them anew, and building them up into a certain shape for the time they are made to last. In short, Life rests on the metamorphosis or Renewal of the body; as this renewal is more thorough, the individual is more perfect, and fulfils better and more completely the duties of its position. If it stops altogether, the body is no longer

living. If it partially stops, the order of normal phenomena is disarranged, and ease is expelled—there is a state which we call "*dis*-order" or "*dis*-ease."

To speak, therefore, of "a superabundance of life," or of an "excess of vital action," is a contradiction in terms. There cannot be too active a metamorphosis of the tissues, for the fresher their organic constituents, the more serviceable they are, and the longer duration they have before them. There cannot be too close an adherence to that typical form which it is the business of metamorphosis to keep up, any more than there can be too exact an obedience to law and order.

The most active metamorphosis of the body possible, the highest possible development of life in every part, is HEALTH.

The complete cessation of metamorphosis is DEATH.

The partial cessation, or arrest, is DISEASE.

In death the flesh goes on being decomposed as during life; but not being renewed, the form is lost entirely. In disease, decomposition goes on, but renewal flags, and the decomposing tissues are not sufficiently pushed out by new-formed substance. They are retained as part of the imperfect body—a sort of "death in life"—and are rightly termed by the pathologist "degenerate." They are generated, but not *re*-generated; they are generated in an inferior mould of form.

Take as an example what happens sometimes to voluntary contractile fibre. We all know that if an animal's limbs are duly employed, the muscles keep up their shape and their vigorous power of contraction; their tissue is of a rich bright red colour when the animal is fully grown, and is firm and elastic. Examine it under a microscope, and you find it made up of even parallel fibres, each fibre seeming to be engraved over with delicate equidistant cross-markings, like a measuring-tape very minutely divided. The more the muscle has been used in a well-nourished frame, the more closely it conforms to the typical specimen of the physiologist:—

> "Use, use is life; and he most truly lives
> Who uses best."

But suppose this muscular fibre has been unworked—suppose it is in the biceps of an Indian fakeer, who has fastened his arm

upright till it has become motionless, or in the gluteus of a soldier's amputated leg, or the calf of a Chinese belle, or in a paralysed limb—then the flesh is quite different in aspect; it is flabby and inelastic, of a pale yellowish hue, and makes greasy streaks on the knife that cuts it. Sometimes even all traces of fibres have disappeared, and it is converted into an unhealthy fat. Sometimes you may trace fibres under the microscope, but their outline is bulging and irregular, the cross-markings are wanted, and you see instead dark, refracting globules of oily matter in them. In short, the muscle is degenerating into fat, retaining in a great measure its shape, but losing its substance. Such is, by God's law, the penalty of not using His gifts for four or five months.

Now go back to our first sepulchral illustrations. M. Devergie found that in a period of between four and five months the flesh of a corpse is converted into a substance technically termed "adipocere:" an oleaginous substance between fat and wax—an artificial fat the result of chemical decomposition. What is this but precisely that which happens to the disused muscles in the cases quoted? At the Morgue, a continuous stream of water washed away the fetid gases from the subject of M. Devergie's observations, and in the living body destructive metamorphosis and excretion remove the more directly noxious particles; in both there remains the same oleaginous residuum.

The instance chosen of diseased structure was purposely an extreme one; but even there, a very high degree of partial death was seen not to be inconsistent with life. A less degree is not inconsistent even with active usefulness. Look at many a man whom his physician knows to have a weak or slightly-dilated heart; he goes on with his profession, mixes in society, enjoys his quiet pleasures, and may even insure his life by paying an extra premium. Yet if an accident at any time should cut him off suddenly, the muscular tissue of the heart will be found pale and soft, while under the microscope the fibres are seen deficient in clear outline and in cross-markings, and exhibit here and there minute specks of that fatty degeneration which was so conspicuous to the naked eye in M. Devergie's subjects and in the completely palsied limb. The more dilated and the more weak the heart, the more widespread

is this degeneration. Yet enough of active structure is left to carry on the work of the heart, and perhaps to prolong life to its allotted three-score years and ten.

A close copy of the pathological process may be made by soaking a piece of muscle, say from a healthy sheep's heart, in a running stream, in weak spirits and water, or in nitric acid and water, for a few weeks, when sections made from time to time will exhibit the several stages of fatty degeneration, from the minute specks in the scarcely-altered muscle up to complete conversion into adipocere.*

Remark in these cases of fatty degeneration or decay that the substance which replaces the highly-organized animal matter is not utterly inorganic. It is less organized and less organizable, but still capable of being called alive. Of our living bodies fat is a part and a necessary part; but still it is not capable of performing the highly vital duties of muscular tissue, of being as thoroughly alive. Degenerated products, therefore, so long as they form part of the body, may still be said to be alive, but *less* alive than the normal tissues they replace; and degenerate growth may be justly described as "diminished life,"—or in the words I lately used, "partial death." Degeneration, in short, is a more or less relapse into a lower and lower form of organic life, and exhibits itself therefore in a variety of grades and amounts. Occurring in various parts, it occasions three quarters of the chronic illnesses which give work to the physician.

Let it be well understood that these half-living tissues are by no means necessarily lessened in size. A battered and renovated vessel is often much bulkier than a strong new one; and in the same way these under-nourished parts are often enlarged, and so have been wrongly supposed to be over-nourished. They often attain a most cumbersome weight and bigness without really containing tissue enough to do their work. They become, in truth, a foreign substance. Sometimes they acquire what seems like a parasitic life, and grow as if independent of the body which they inhabit. Then you justly look upon them with a peculiarly unfavorable eye, and call them by the epithet

* Figured in 'Medico-Chirurgical Transactions,' vol. xxxiii, plate v, in illustration of a paper by Dr. Quain.

"malignant." Cancer is the best-known example to quote; and you who have watched its deadly quickness of growth are perhaps wondering that it should be put forth as an instance of lessened vitality. But watch further with the mind and not with the eye only; you will see that its tissue never gains the higher characteristics of life; it never puts on the *form* of the part it is planted in, nor performs its duties. Moreover its half-life, so easily acquired and so easily multiplied, is also easily lost. Its very tendency to die and to ulcerate is one of the chief dangers in which it puts your patient.

But we are now driven to seek our illustrations among these dreadful sorrows of our kind, when we can find them in less painful scenes. Every one connects cancer and degeneration with death; but perhaps it is not quite such a familiar idea to see partial death in a cold in the head or relaxed throat. However much you may smile at the notion, it is a true one; and I should advise your taking the next chance which a catarrh gives you of seeing the truth and its bearings. It is almost worth while to catch one on purpose, so valuable is the lesson. And perchance your smile may become a grave and thoughtful one, when you reflect on the mysteries of life; when you think that the slight inconvenience you are bearing is of the same nature as that which divorces soul and body, a distant and indistinct foretaste of that dread cup which we must all one day drain.*

Look at your catarrhal throat in a mirror—what do you see? The surface red, puffy, and with the component parts, such as the uvula, enlarged. There is also poured out a quantity of slimy material, which you well know by the name of mucus. At first you may be disposed to cry, "Surely here is an active business going on; everything seems much more lively than usual; life is increased, not diminished." Not so fast—examine in a microscope a little of this mucus, and you will find it made up of minute balls of transparent jelly with a granular aspect,

* And perchance also this may be an useful meditation, not only for medical men, but also (as is remarked in an article on "The Renewal of Life" in the 'Medico-Chirurgical Review' for July, 1863) for amateur tamperers with life, who in their zeal without knowledge are so fond of remedying minor bodily ills.

technically called "exudation globules," "mucous globules," and "pus globules," floating quite free, and rolling over and over without any tendency to adhere together. Are these bodies a new creation, something which an inflamed membrane can produce, while a healthy one lacks the power? are they evidences of an additional life-force? By no means; for they have been identified with those elementary forms of nascent life by which all organic matters grow; they are young cells, or rather nuclei.* They are the form assumed by all liquid living material which under the influence of life is being transformed into a solid; they are an infant tissue strangled in its birth. Instead of uniting into a continuous web to clothe with epithelium the surface of the membrane, they float off helpless from deficient vitality. The business of mucous membranes is to be covered with epithelium, not to throw off mucus; and when they are doing the latter, they are so far forth in a state of diminished life.

But you may ask, what is that redness and that throbbing of the inflamed part? do not they show an increased circulation of the vital fluid, and therefore increased life? Quite the contrary, for the membrane is red because its blood-vessels are relaxed and dilated from loss of vital elasticity; the blood sticks in them as water in a bulged pipe; and the arteries, pressed upon from behind by the heart, throb because the obstruction impedes their action.

"But the pain,—does not that show that the vital power of sensibility is increased? I cannot, in general, feel that I have got a throat; and now I am reminded most disagreeably of the fact." No; pain does not indicate an increase of proper sensibility; in this case it is associated with a very marked decrease. During your catarrh the lining membrane of the fauces loses its delicate appreciation of flavours—everything is equally nasty, unless there is a pungency in it too powerful to be pleasant to the healthy taste. And it is wanting also in common sensibility; for it does not distinguish the shape or size of morsels swallowed, all of which feel equally large and awkward.

* The identification of young epithelium and pus cells, was some years ago amusingly made out by M. Lebert, who, in plate iii, figs. 3 and 6, of the atlas to his 'Physiologie Pathologique,' places them in opposition, with the intent of pointing out their differences, but with the result of showing their identity.

Or you may get a whitlow on your finger, or a boil, and study how the nail is stayed in its growth, and the skin is killed; while the materials intended to renew them are checked in their development, and go to be deposited as pus, a concentrated form of half-vitalised fluid, very similar in every respect to mucus.* And, like your catarrhal throat, your inflamed finger-tip is wanting in sensibility: try it, and you will find for any delicate work, such as feeling the fine lines of a copper-plate, or the flaws in a polished surface, it fails in its duty. Pain, in short, is the brother of death; a painful part is never performing its whole vital functions—it is partially defunct.

The same partial death, which has been hitherto described as constituting the various diseased states of the solid structures of the body, may also attack the fluids; and in them, as in the solids, it may show itself either as a destructive relapse into a less organic life, or as an arrest of development. The poison of fever, for example, destroys and renders useless as nutriment some constituents of the blood; the insufficient blood is circulated to all parts of the body, causing, not local pain, but general *malaise* by its deficient vitality. The half-poisoned tissues allow the poisoned material to ooze through them, causing diarrhœas, exhalations of blood from mucous surfaces, purple blotches on the skin, and a general staining of the whole body of a dusky hue. If the quantity of blood poisoned is moderate, it can be easily spared; it is carried off gradually by excretions, and its place is filled up in time by new blood. But if the rare case happens of so much being poisoned at once that too little remains to carry on the business of the body, then death occurs by sudden shock; or if, through ignorance, carelessness, or false theory, there is an insufficient supply of material to take the place of the killed blood, the vitality wanes away more slowly. And as its loss occurs more slowly, some one part more than another is usually affected; there is congestion and inflammation—that is, local death—of the digestive viscera, or of the lungs, or of the brain, and the patient's disease is allotted by name to that last cause.

* On the pus formation in connective tissue, see Virchow's 'Cellular Pathology,' fig. 137, and text adjoining, and the Lumleian lectures which follow in this present volume.

And thus in fever, the blood relapses into a less organic form through its vitality being destroyed by a morbid poison.

Let us next look for an instance of imperfect life in the blood occasioned by arrest of development. You are all practically familiar with the condition, so common among hospital out-patients, which you have already learnt to call anæmia. The word means literally "bloodlessness," but in reality relates rather to deficient quality than deficient quantity. The circulating fluid cannot but fill the hollow vessels which hold it, but it is wanting in the most highly organized, the most truly living of its constituents. It is pale, from the diminished numbers of those floating red globules which give its florid hue. This capital of red globules is by far the most important portion of the blood; so much so, that it may be taken as a direct measure of corporeal and mental vigour; a man has a larger proportion than a woman, a strong man than a weak man, an adult more than a youth or an elder, a patient after recovery more than during his sickness of whatever kind, a horse in high condition more than when brought up from grass. Yet in spite of this importance, we find to our surprise that this floating capital may be largely encroached upon without a bankruptcy. For example, Dr. Andral has analysed the blood of a patient with anæmia, where the blood-globules amounted to less than 39 parts in 1000, whereas their natural proportion should be at least 120 parts in 1000. More than two-thirds of this constituent were missing! And yet the patient was living and moving, and very likely quite recovered in the end if rational treatment was adopted. Now, in pure anæmia there is not found any degenerated devitalised substance; the missing globules have not relapsed into a lower life, so that their ruins or débris should constitute a foreign morbid matter; they have been used up in the regular way, and have supplied materials for the tissues, as they are moulted off from day to day; while at the same time there has been a want of renewal, an arrest of that continuous development of blood, which is necessary to complete life.

Pure anæmia has been spoken of; but, as might have been expected, this defective supply of the materials of growth much weakens the vitality of many of the manufacturing and excreting viscera: for their machinery needs continual repair, as much as

any part of the voluntary apparatus. Hence, in cases of anæmia we often find that the liver is not so lively as it should be, and some of the colour it ought to get rid of stays in the circulation, or exudes and chronically stains the skin of a bilious hue. Or perhaps the kidneys do only half work, and the urea which they ought to drain off is retained, causing very serious derangements of health. Thus there is a mixed pathology in these cases, a combination of arrested life with a relapse into a lower life; the life of the specially affected organ is diminished, and it leaves behind in the system substances of inferior vitality which its proper business is to excrete or separate.

Or again, anæmia may so lower the creative power of the blood, that instead of the body being built of elastic and highly vitalised fibrin, it has to put up with a cheesy, brittle substance called tubercle. This is just the sort of fraud a rascally contractor commits, when he lays your floors on half-seasoned timbers. Your house is destroyed by dry-rot; and the lungs in which tubercle has been substituted for healthy connective tissue gradually soften and break up. The most effectual remedy in both instances is to look after the builders, to secure the honesty of the one and the vitality of the other as far as possible.

When the various accidental circumstances of our daily habits dispose various parts of the body to even the few elementary forms of disease which I have mentioned here, a great variety of abnormal phenomena may be produced. Our body is a harp of so many strings, that all sorts of discords may arise out of its combinations.* These discords have received much attention from minds with a taste for order; they have been classified into groups; and if, unfortunately, the orderly mind was afflicted with a theory, sadly have facts sometimes suffered by the Procrustean bed of a Nosology, into which they have been forced. On the whole the nosologists (Νοσολογοι—people who talk about diseases) have been convenient, for their nomenclature often helps us to describe in one word what otherwise would want a parenthesis. But they have been a convenient evil, and their labours have had this bad result; they have attributed a positive existence to that which in reality is a negation. "*A*

* "Strange that a harp of thousand strings
Should keep in tune so long."—Watts.

Disease," under their manipulation, instead of being a mode in which life is deficient, becomes an actual motive power; the giving it a generic and specific name links it in our minds with the subjects of a naturalist's studies, and we get to clothe it in individual characteristics, and to assign to it individual actions. The consequences in science have been most fatal to true progress. It has had upon the art of medicine just the effect that would be wrought upon Optics by regarding a shadow as a material object instead of an absence of light, upon physics in general by accounting cold instead of heat as the active agent. The main hope for bringing Therapeutics up to the level of modern science lies in discarding at once and for ever this traditional notion.

I am glad to say less practical harm than might have been feared has been done by these false notions. In the first place, man's body is tougher than usually thought, and will stand a great deal of wrong treatment; and, secondly, experience has somewhat checked the bold hand of a relentless adhesion to theory. Still, it can hardly be doubted that the increased chance of cure under professional treatment has not been so much as might have been expected from the advance of general knowledge.

Of late medical art as far as practice is concerned has been turning over a new leaf; nosologists are of less repute, and at last under the influence of common sense, attention seems directed to the maintenance of life *in* the body more than to the expulsion of death *out* of it. Such is the true preaching to the sober mind of the new modes of treatment which, without falling in with the dogmas of any particular "*pathy,*" have yet been silently adopted by the rational adherents of each within the last few years. I may instance the care bestowed upon the selection of alimentary substances; the use of water, of oxygen, of iron, of animal oils, of chlorine, of soda in doses more like a food than a drug, of lactic and other organic acids, of salts of phosphorus and lime, of sulphur, ammonia, bile, pepsin, and several other agents established by common consent without being suggested by any previous theory of therapeutics, or traditional rules of the medical art. These are constituents of the animal frame, and are administered and trusted to as filling up an obvious void.

If experience has taught us to reform our practice, should it not teach us to reform our theory too? that so the partial advantages which have been gained might become universal, and our words and acts might cease to be inharmonious.

I began this lecture by likening the animal body to a building constructed of perishable materials, which need continuous renewal to maintain the usefulness of the structure. To keep up the simile, the permanent architect is the indwelling life, and he best performs his duty, not by fits and starts of work, but by ever-watchful industry. He should be every moment removing decaying materials from the walls and working machinery to be carted away at convenient periods, and he should be every moment supplying their place by fresh. Thus there are two departments carried on simultaneously—the "destructive" and "constructive;" and upon their harmony and completeness depend the perfection of life which we call health. Both are necessary; and the deficiency of either or both, or the preponderance of one over the other in various parts, or their deficiency in one part while other parts remain active, constitutes a deficiency of life—a disease.

This deficiency the physician is called upon to remedy; and it is of the utmost importance to his usefulness that he should recognise that it is a deficiency, and act upon the recognition. He must look at his pharmacopœia with this thought constantly present before him, with an eye to the ultimate benefit of the patient, to a goal beyond that of the immediate effects. He should make his chief thought how each of the reagents employed will finally touch life; whether they are calculated to add to or diminish the vital functions, to add to or diminish the vitalized substance of which his patient is made—whether by temporarily diminishing the functions or substance he may not remove an impediment to their balanced actions, so as to lead to a final increase—or whether this artificial diminution of functions or substance may not become permanent, and inflict permanent injury on his patient. This final goal of life renewal must be consciously or unconsciously in the heart of the physician, or in the heart of his guides; otherwise I am sure he contributes more to the ill-health than to the good-health of mankind.

LECTURE II.

DISEASE AND CURE.

What is cure?—Classification of disease, for therapeutical purposes into deficiencies of growth and deficiencies of moulting—Deficiencies of growth from Chossat's observations—Analogous natural states in disease—Deficiencies of moulting—True and apparent—Mixed lesions—Natural cure and artificial cure—Cure originated by the healthy parts of the body—Classification of means of cure—Constructives—Destructives—Arresters of construction—Arresters of destruction.

(*Introductory, St. Mary's, October* 5, 1863.)

You are entering the hospital wards to study Disease—that fitful twilight coming between the glad radiance of life we call health, and death, the drear darkness of its departure. You see the gloom sometimes irrevocably deepen, more often melt back again into the beams of returning day; and you would fain learn how to aid this joyful event which we hail as cure. To minister to it is to be the business of your lives; and therefore time cannot be wasted in first thoughtfully considering what it is.

Healthy life consists in a continuous and equally balanced repetition of the two necessary parts of the renewal of the body, constructive and destructive assimilation, in other words, "growing and moulting." The essential nature of disease, that which makes it disease, is a deficieney of health, a deficiency of either construction or destruction in one or more points. The cure of disease, natural or artificial, consists in a new birth or renewal of the deficient life.

The practitioner, to whose mind the cure should be the ever

present object, will therefore do well to classify as far as he can all morbid phenomena on this principle; for on this principle will be based his most successful practice.

Do not suppose that I am here condemning or proposing to reform the existing nosology of statisticians. Every classification must be constructed for a specific purpose; it can be complete, and its classes be prevented from overlapping, only by that one specific purpose being adhered to. The hospital porter divides diseases into those of males and those of females, and subdivides these again into medical and surgical. An officer of health divides them into epidemic, endemic, enthetic, sporadic, &c.; a philanthropist according to their causation by various occupations, as diseases of painters, clergymen, coppersmiths, chimney-sweeps, &c. An anatomist arranges them "*a capite a calcem*," (as Morgagni says he does), according to the part affected. A pathologist aims high at a kind of natural system, and classes together those phenomena whose essential nature, whose morbid processes seem alike; for him diseases are primarily divided into zymotic, tubercular, cancerous, hæmorrhagic, catarrhal, arthritic, &c. The Registrar-General, who has to provide a single nomenclature for a great variety of temporary purposes, and suited to a great variety of minds, wisely contents himself with a very imperfect and illogical classification as a gradual stepping-stone to a better. For nomenclature the best working classification is the one which contains the greatest quantity of well-known names, and for common purposes that which is most common.

But this classification is most faulty when applied to aid us in therapeutics. To make it our only classification is to introduce an arbitrary method into the treatment of disease which cannot but impede all true progress, not only in the mind of the individual practitioner, but of the art itself.* However, our

* The danger is clearly pointed out in the 'London Medical Review' for March, 1863. "The dictionaries and encyclopædias of medicine, useful as storehouses of facts, have done much to perpetuate this error with the unthinking portion of our fraternity. With many even at the present day a sick person is regarded as a sort of living conundrum to which there is but one correct solution—a Greek or Latin word indicating his disease. When this is guessed, the word is as it were 'looked out' in a sort of mental dictionary

possession of it and use of it for its intended purposes, does not preclude special classifications for special objects; and, indeed, the more ways a man has of classifying a subject the more he will know about it, and the more ready he will be with his knowledge.

I shall, therefore, not hesitate to recommend for therapeutical purposes an attempt to classify morbid phenomena after a fashion which I confess would be inconvenient, if not impossible, to apply to them for other objects.

Life we know to be a state of unending change; and this change is double—constructive of the body from foreign materials, and destructive of it into inorganic elements. The physician, then, in his ministry of the living body, has to be always dealing with construction or destruction, or both together; and it must make a great deal of difference for him to be able to recognise which part of life he is dealing with; because the instruments he employs to modify these opposite parts of life must be in some way of opposite natures.

Therefore I cannot but think we should be contributing very much to our practical usefulness, if we tried habitually to divide morbid phenomena into (1) Deficiencies of nutrition or constructive form-building, and (2) Deficiencies of moulting or form-destruction.

We should thus have ready to hand a decisive spur to a definite course of treatment in all cases; whatever empirical or traditional means we adopt would be under the control of a final principle, and we should feel quite sure that we were at all events aiming at a rational end.*

But is it possible to make this division? Much more possible than appears at first glance, if we will first consent to clear our minds of nosological prejudices begotten of old theories, and come to the task fresh and unfettered, ready to accept all the

where the practitioner finds against it appropriate treatment according to his lights. The arbitrary practice thus induced strongly resembles the child's idea of colouring a printed sketch—this is a tree, and therefore it must be green; sky, blue of course; water, ditto; glass, ditto; a road, burnt sienna." There are some excellent remarks on classification in the preface to Dr. Reynolds' volume on Epilepsy.

* In my systematic lectures on the practice of medicine I have been used for the last ten years to adopt a classification similar to this in the first part of the

conclusions which independent observation may supply. I will point out a few of the more obvious sources of knowledge which may help us to the required end.

(I.)

First for deficiencies of nutrition or form-building.

The morbid phenomena capable of being classed under this head are doubtless to be found most purely displayed by starvation and loss of blood in otherwise healthy bodies. The labours of M. Chossat and Dr. Marshall Hall have almost exhausted these subjects, and are easily accessible to all.

We find fully established by M. Chossat's* rigorous experiments on healthy animals certain phenomena as resulting from the deprivation of food, and therefore as resulting from the arrest of continuous growth by the want of its material. They

course, which includes general pathology, and consequently the principles of therapeutics

- Morbid Changes in Fluids .....
  - *Loss of normal constituents* .....
    - *Of whole of blood* — Hæmorrhage, transudation.
    - *Of part of blood*—Serous discharges, sero-fibrinous ditto, anæmic, albuminuria, &c.
  - *Abnormal retention of excretions* .....
    - Uræmia, asphyxia, jaundice, lithic acid and oxalic acid diathesis, &c.
  - *Foreign additions* ...
    - 1. Common poisons.
    - 2. Morbid poisons.
- Morbid Changes in Solids .....
  - *Arrests of development into normal tissue* .....
    - (1.) *Of blastemas*—Mucus, pus, tubercle.
    - (2.) *Of cartilage-cells*—cancer and some other tumours.
    - (3.) *Of white fibrous tissue*—Cirrhosis, false membranes, granular kidneys, contracting scars, &c.
  - *Retrograde change into less vital tissue*, or degenerations, fibrinous, waxy, fatty, chalky, or mineral, &c.
  - *Foreign additions* ... Parasites.

In the second part of the course these changes are arranged anatomically.

* 'Recherches expérimentales sur l'inanition.' Paris, 1843.

are as evidently phenomena of innutrition as the ruin of an unrepaired building is a phenomenon of the want of bricks.

Prominent among these phenomena we find—

1. Collections of fluid in the serous sacs (p. 73).
2. Œdema of the extremities (p. 82).
3. Softening and destruction of the mucous membranes (p. 85).
4. Thickening of the epithelium in other parts (p. 86).
5. Blackening of the viscera, especially the liver; and reddening (? with hæmatine) of the secretions, at least of the bile (p. 74). Sometimes the substitution of brownish-red congestion for the black (p. 74).
6. Bluish, livid, yellow, whitish and reddish stains during life in the transparent parts of the skin (p. 73).
7. Loss of weight, producing death when it amounts to $\frac{4}{10}$ of the normal weight (p. 21).
8. Hectic fever. That is to say, very marked oscillations of the diurnal variations of temperature (p. 123).
9. A continuous decrease in the power of the body to resist cold (p. 132).
10. At first a scanty excretion of dry, bilious, grass-green fæces, and afterwards diarrhœa of liquid saline matter (p. 151).
11. Excitability of involuntary muscular fibres by stimuli. Even after death the auricles of the heart of starved animals retained for an unwonted length of time their contractility on being touched (p. 150).
12. Convulsions, similar to those in death by hæmorrhage (p. 187). The convulsions were often opisthotonic.
13. In comparing the losses of substance in the different tissues of starved animals, the nervous system appeared to have suffered least, and indeed retained nearly its full weight after death. This and the former observations seem to point it out as the true *ultimum moriens* in such circumstances (p. 91).

Here are a collection of phenomena which we are daily witnessing in our patients, modified of course by the fact that in them usually the defect in the supply of materials of growth is but partial. Shall we be wrong in attributing such phenomena to innutrition? Still more, shall we be wrong in treating them as innutrition?

I will allude to a few of the cases in which you see these phenomena as the result of the imperfect vitality we call disease, referring by a corresponding numeral to similar phenomena intentionally produced by starvation in M. Chossat's experiments.

1. The conventional term "effusion" applied to dropsies of the serous sacs is misleading to students. They are apt to fancy it an active process, in which the inconvenience arises from the membrane "effusing" too much fluid, and their minds are immediately directed to the necessity of checking this imaginary activity; whereas in reality the membrane need not pour out more than it does in health, nay, it may pour out much less than it does in health, and yet dropsy very rapidly take place by the arrest of absorption; and it is from this arrest of absorption in consequence of generally diminished vitality that collections (as they should be called rather than "effusions") of fluid take place in the pleural, peritoneal, and pericardial sacs.* You find them in anæmia, hydræmia, uræmia, leucocythæmia, and other conditions yet unnamed,† where the blood in the diminished proportion of its chief vital constituent of red globules typically represents in common parlance the generally diminished vitality of the whole body. From the diminished consistence of the circulating fluid the endosmose inwards of liquids, that is, absorption, is diminished according to the well-known law of transfusion.

Again, these collections of fluid arise wherever the circulation is arrested by mechanical impediments, as in cardiac or hepatic disease for example. Here comes into play another law of diosmose, namely, that in the case of a moving liquid it takes place in a direct ratio to the quickness of the motion. The more the circulation is slackened the more obstinate the dropsy is, and increasing its living force and freedom cures the patient.

If we cannot detect any of these explicable organic modes of dropsy's origin, it is still surely philosophical to conclude that a similar agency, a similar deficiency of life is acting throughout.

* See Lecture XVII of this volume, on hydrothorax.

† It must not be supposed that nosologies contain a name for every possible morbid state: many, by no means uncommon, can be described only by a periphrasis, simply because nobody has taken them up in special—*carent quia vate sacro.*

2. The remarks I have made apply equally well to anasarca, which is a collection of fluid in the minute sacs of the areolar tissue, instead of the large serous sacs.

3 and 4. It is most interesting to find morbid states of the mucous membrane characterised by softening and destruction, and also by thickening, produced as the direct result of inanition. How apt we have been to look upon this changed form of vitality and this accumulation of semi-vitalized substance as evidence of activity! how apt we have been to reduce the vitality in our aims at cure! I need hardly allude to ulcerations and rugged conditions of the stomach, of the throat, of the vagina, and neck of the womb, which have been treated to their great injury by depressing medicines.

5. We are very much inclined from ancient prejudices to take congestion for a proof of active life, and the red, black, or other dark-coloured relics of congestion, as post-mortal evidences of activity in the organ so discoloured. It appears to indicate the direct contrary.

6. So also with livid and reddish discolorations of the living skin. How often do you hear it remarked that a red, bloated-faced man wants "bringing down," when, in fact, what is required is a more vitalized blood, and a more vigorous action of the heart and arteries. How often is a patient drenched with mercurials and purgatives because he is "black under the eyes," when tonics and bitter diet are the true specifics. Blueness and blackness of the sclerotic, again, is a safe indication for tonics, and the finger nails may also be used as a guide to the same treatment.

7. The regularity with which death results on the loss of a certain amount of weight should lead us to make more use than we do of the balance, that easily applied aid to diagnosis, prognosis, and treatment. It is a direct measure of the success of our medicines, or of the progress of disease.

8. Hectic fever is an obscure subject. But I think some approach to an elucidation of it may be made from the direction of those singular nycthemeral oscillations of temperature which take place in health. In full vigour, the normal production of animal heat rises gradually up to its maximum at noon, and falls to its minimum at midnight. In health this

variation is slight, but in the simple debility produced by deficient food it is more than quadrupled. In M. Chossat's experiments it rose from 0·74° to 3·28°. The extreme of heat was so much more, and the extreme of cold was so much more than in health; and not only was this change observed, but also that the periods of the accession and diminution became irregular, and were not governed by the diurnal time. Do not these observations distinctly associate periodic fevers, and through them perhaps the periodicities of disease, with direct debility?

9. The liability to be injuriously affected by external agents, especially by cold, is a sure proof of deficient vitality. This, in our patients, is not always accompanied by sensitiveness to the changed temperature, but is made evident by catarrhs, bilious attacks, local inflammations, congestions, &c., and is often popularly rated as characteristic of "an inflammatory subject."

10. M. Chossat's observations of the alvine evacuations are very valuable. Let us never forget that not only constipation, but also diarrhœa and an exceedingly foul condition of the excretions, may, and in fact generally do, arise from mere inanition. This is an important lesson for routine adherents of blue pill, grey powder, and black dose.

The commonest instance we have of fetid evacuations from inanition is that of unfortunate babies who have been starved by hand-feeding, or the imperfect condition of their mother's milk. Doubtless mercury will make the stools less disagreeable, for it throws into the bowels a quantity of bile, which prevents their decomposition, but that is done at the expense of the poor infant's body, and the patient is sacrificed to save our noses or our theories.

11. The weaker the life the quicker the heart beats, and the readier is it excited. This phenomenon is particularly well marked in zymotic fevers, where the rapidity of the pulse is a good guide to the degree in which the poison of the fever has affected the system, and what force the system has to bear up against the poison. In pneumonia too, the rapidity of the pulse is usually in a direct ratio to the danger, and to the necessity for opiates and stimulants. In pulmonary consumption,

starving, depressants, expectorants, salines, and all that is usually classed as antiphlogistic treatment, makes the pulse quicker and quicker, and nothing reduces it so steadily as oil and other restoratives.

12. The knowledge that convulsion arises when there is a deficient supply of blood to the brain, has been a long time in forcing upon the profession the conviction that it is a disease of inanition. Perhaps the impediment has been the finding in post-mortem examinations black blood, rendering abnormally conspicuous the smaller vessels and capillaries, when, in certain diseases, convulsions have preceded death. The blood is too visible, and so the fallacy has been jumped to that it is too abundant. The real fact is, that it is too stagnant, that it is too arterial, too little renewed. Perhaps the great show that convulsions make, the natural awe which they excite among the bystanders, and the active help they seem to call for, impress us with an idea of activity of life in the sufferer. Chorea, epilepsy, teething fits, convulsive apoplexy, delirium tremens, hysteria, and some forms of mania, are familiar instances. But in all of these every experimental improvement made from year to year in the treatment is in the direction of replacing lost nervous power, not of restraining its excess.

13. The difficulty which the nervous tissue exhibits in parting with its substance by vital decay, explains the difficulty of its renewal. There are no patients so slow in recovering health as those whose nervous system is exhausted. They are months or years in getting ill perhaps, and they are months or years in getting well. Let our recollection of the slow growth of this tissue comfort us under such circumstances. The time and compulsory idleness needful for its restoration make it the most expensive of tissues to get worn out, and rightly enough its higher manifestations are most highly paid for.

Among diseases of deficient construction may also be included the tissue diseases of degeneration, where instead of highly vitalized elastic material a brittle, or a soft, or a formless mass is deposited. It is alive, but imperfectly alive, easily dies, and is useless while it lives. Tubercle is a substance of this sort.

It appears strange at first glance that some organic matters which are referable to this class should carry out of the system

with them a spark of half independent vitality. Cancer, for example, multiplies itself conspicuously, and so does pus in a more hidden manner, so long as they can get their food from the body. But this multiplication is the lowest (one might say the most diluted) form of life, and certainly indicates no redundancy in the parent system.

M. Chossat remarks, "Bichat and the physiologists who have been occupied on the same subject before and after him have thrown the greatest light upon the causes of death, by classifying them according to the functions which help to bring them on. In dividing death into death by the brain, death by the lungs, and death by the heart, they run through the series of vital functions, and suppose that they have thus exhausted the subject. However, on coming to facts, it is certain that we thus explain but a small number of the cases of death, and that the great majority of those brought under our observation escape this classification. This is so even in the cases which seem easiest to lend themselves to this division. In pulmonary consumption, for instance, who can say that usually death supervenes by asphyxia? for the lung on the day of decease is not, as a rule, more disorganized than it was the day before; and yet the day before it sufficed for the aeration of the blood. On the other hand, who has not witnessed autopsies in a number of febrile maladies, in which there is no morbid change found, except lesions, often very insignificant, in the intestinal canal? One cannot, without doing violence to the judgment, consider these as sufficient to account for the death. The fact is, the classification of Bichat does not explain all, and to the three modes of death which he points out we must needs add at least a fourth—death by the digestive apparatus, or inanition."*

M. Chossat is quite right; indeed he rather underestimates his case: very much more than half the patients we lose die from imperfect nutrition, and very much more than half of those who recover gain that end by chanced or designed restoration of their digestive functions.

Exactly the same means that prevent death, prevent or cure disease. This may seem a platitude, but it is a very important one, and must not be allowed to "lie bed-ridden in the dormi-

* Page 194.

tory of the soul" because it is so true. We are all ready enough to admit that when a patient is in danger, the first thing to be done is to keep him alive. Let us act in the same way when he is not in danger; cure him by keeping up the partially or locally failing life. Postpone partial death, as you would postpone total death.

(II.)

Disease of destruction, or deficient moulting, arises when the functions whose business it is to remove effete products from the tissues are inefficient. I say "functions" designedly instead of organs, in order to include the whole process from the period when the tissue becomes effete to the expulsion of the products of its decay from the body. For in whatever part of the process a check takes place, the result on the whole health is identical, and the principles, though not perhaps all the details, of the treatment must be the same. And in whatever part a check takes place, the main injury is the stoppage of vital metamorphosis at its origin.

This is the case even in mere mechanical obstruction. Take for instance the impaction of a gall-stone in the common duct; first, the intestines are in want of bile—that is a deficiency they can easily bear; then the gall-bladder and ducts get distended—which does not interfere very much with the patient's comfort; but the real serious injury is the non-removal from the blood and tissues of what forms the biliary secretion. And the injury is of exactly the same nature, whether the jaundice arises in the mechanical way alluded to, or whether it arises in the ultimate tissues themselves, as jaundice from mental impression for example.

It might seem at first sight as if diseases of deficient moulting were exceedingly easy to detect, and to reduce to classification. We are in a position to measure accurately the quantity and quality of the most important excretions, and can approximate to a knowledge of those not so readily reckoned. We can know by experiment the daily excretion of urea, phosphoric acid, sulphuric acid, and water by the kidneys; of carbonic acid by the lungs; of fæces by the bowels; of water and salts by the

skin, and we can find out with a fair approach to accuracy when these are diminished. But in the great majority of cases this diminution is in reality the consequence of deficient supply: vital decay does not remove the tissues, because there is no new material to take their place. To call these cases instances of deficient moulting is a misappropriation of terms, and to treat them as such most pernicious.

The most familiar example is the amenorrhœa of weakly females. To what purpose are emmenagogues? Why should we wish to force the ovaries or uterus to bleed, when the reason why they do not bleed is that there is not enough blood formed? The custom of administering purgatives, whenever the bowels are not open so often as those of robust persons, is another too familiar instance of mistaking the true nature of the deficiency.

The only diseases we can safely refer to the class now considered are those where the effete product is obviously retained in excess in the system, and where the impediment to its excretion is usually the imperfect action of the secerning organ, such as uræmia or the excess of urea in the blood from degenerated kidneys, asphyxia or retention of carbonic acid from non-aeration, jaundice from mechanical impediment, or incomplete development of hepatic cells, and perhaps certain cases of the lithic acid diathesis.

In most of the patients we have to do with, both classes of morbid phenomena are united; there is a general deficiency of life, and both nutrition and destruction are below par, often in equal, more often in unequal proportions. The instance I have just given of uræmia is in point; one marked change in the blood is the retention in it of urea, the product of destructive metamorphosis, which acts as a poison; but another change, certainly more worthy of consideration as being more under our control, is the absence of red blood-discs by reason of defective nutrition. Hence we have mixed phenomena from the union of the two.

I would say incidentally that there are few cases in which the defective nutrition is not at the same time the most important in a pathological sense as explaining natural phenomena, and at the same time the most important in a therapeutical sense, as being the most easily compensated.

Be it remarked also that mixed phenomena, requiring mixed treatment, arise sometimes from the deficiency in one part of the chain of vital acts overthrowing the balance of functions found in health. An apparent excess of certain functions or constituents arises from the absence of those which normally are in correspondence with them. Thus Dr. Prout, to whom the pathology of urinary diseases owes so much, speaks of a "phosphatic diathesis," and we not uncommonly hear medical men speak of "phosphatic urine" as if the ailment were an excess of the salts of phosphorus; although in reality in such cases those constituents of the excretion are usually less copious than in health, and are deposited only from deficiency of the acid which should hold them in solution.

The object of medical treatment is cure. The end of the physician's labour and care is accomplished by the patient getting well. What is this cure or getting well? It is a restoration of the disordered body to its natural state of ease or health.

This restoration we often see come to pass independent of any interference from without, by what is allegorically called an "effort of nature." Wounds heal, diseases cease, in men and animals who have none to help them. The event comes about, not in consequence of the driving out of any *materies morbi,* but on the resumption of their normal functions by the diseased organs: the full vital force regains its influence in them, and they recover. The social disease of "a strike" is cured by the hands going on work again.

Now diseased organs must necessarily have less power in them than healthy ones; and it is obvious therefore that the curative vitality must mainly be due to, and proceed from, those which remain healthy. It is to their having some sound action to spare that the sick man owes his recovery. The vital force at the same time removes the retained products from the tissues, and replaces them by new material. This is the true teaching of nature's cure.

Cures by art are effected in exactly the same way. Every artificial appliance which does not aid this one only mode of

recovery is an impediment to it, or simply a nullity. A drug in itself effects nothing by its mere chemical or neutralising influence; it is the vital power which this drug calls forth, or frees from a burden, that is the true healer. Quinine, for instance, will not neutralise malarious poison; Peruvian marshes are not less deadly for cinchona trees falling into them; but the drug's vital action on that which remains healthy of the body cuts short the fever which is the consequence of that malarious poison. The action of a remedy by which a sick body becomes sound must be looked upon as a vital act of the body itself and not a simple act, but a series of vital acts, which grow out of one another in regular succession as the branches grow from a tree. They are not dependent upon the continuous presence of the remedy, but persist long after it is removed from the system, just as a railway train goes on "of itself" (as we conventionally say) when disconnected from the locomotive. The true art of healing consists in the establishment of vital acts tending towards the renewal of the body, towards a new birth of deceased tissue, and in the encouragement and aiding of those vital acts after the removal of their original excitant.

Since there are two parts in the chain of life, "construction" and "destruction," and since external agencies may act upon these in two ways by increasing them or diminishing them, a primary fourfold classification of curative agents naturally arises; and this will be the most handy classification for a practical man.

We have—

(1.) CONSTRUCTIVES (ἱστοτρόφικα) or aids to formative nutrition.

(2.) DESTRUCTIVES (ἱστολύτικα) or augmenters of destructive assimilation.

(3.) ARRESTERS OF CONSTRUCTION (βιοδεσμευτικα).

(4.) ARRESTERS OF DESTRUCTION (βιοφυλάκτικα).

Among CONSTRUCTIVES we have the following classes:—

1st. *The materials of which the body is built up: albumen, fibrine, gelatine, fat, oil, water, iron, lime, phosphatic salts, soda, ammonia, sulphur, oxygen, &c.*, which are generally taken in the form of food.

2nd. *Medicines which appear to act by replacing necessary constituents of the body.*—This is as yet a very dimly under-

stood class; but we may hope something from the progress of physiological chemistry to explain the action of sundry medicines, which we cannot doubt will be proved restoratives, though we cannot at present see by what steps. *Quina* and other vegetable alkaloids may be taken as an example, whose cure of ague may be best explained by supposing them to replace some constituents of the body destroyed by malaria.

3rd. *Digestive solvents.—Water,* which must be in excess of that required in the structure of tissues, and without which the said materials cannot be absorbed. *Carbonic acid*—required to be present in the water for the easier solution of bone, earth, carbonate of lime, and albuminous food which contains them. *Pepsine,* to replace deficient gastric juice. *Lactic acid*—required in the stomach to acidify the mass and enable the albumen to be acted upon by the gastric juice. This may be replaced by other acids, such as *hydrochloric,* or *acetic,* or *malic,* for example, in some cases. *Bile,* in the form of inspissated ox-gall, or liquid ox-gall in capsules, to supply the place of that which is arrested in its passage or in its formation by disease. *Pancreatine,* similar to pepsine.

4th. *Excitants of digestive solvents.—Mineral acids* mixed with the food increase the flow of bile; indeed all acid substances have the power of exciting alkaline secretions. Thus they are useful, not only in jaundice from suppression, but in many cases of indigestion where this solvent is too sparingly formed. In many cases, too, of flatulence from fermentation of the ingesta, mineral acids are beneficial, by causing the pouring out into the intestinal canal of bile which arrests putrefaction. *Alkalies,* on the other hand, will also increase the flow of bile. Perhaps it is that they supply one of its constituents; perhaps (as Dr. Harley explains it) they stimulate a secretion of gastric juice, according to a converse law to that quoted in respect of mineral acids, and this gastric juice excites the bile-flow. It is obvious that to accomplish this object, alkalies must be taken on an empty stomach, otherwise they are wasted, or rather do harm, by neutralising the acid already mixing with the ingesta. *Sugar, peppers, mustard, spices,* and other condiments, act in a moderate degree in the same way, as may be seen by the effects on the saliva; but their influence is limited. *Ease of mind,* or

cheerful conversation, excite the gastric juice; or, I should rather say, they prevent the opposite state of mind which retards the secretion. *Oxygen* has a direct effect in exciting the flow of all the digestive solvents from the saliva downwards. *Water* increases their quantity in the same way that it adds to the solid bulk as well as to the liquid bulk of all secretions.

5th. *Artificial replacement of wanting vital functions.*—The normal animal warmth is a great element in promoting normal reconstructive growth. We know how much more readily internal wounds heal than external wounds; how much more quickly, when they have been carefully covered up and kept at an even temperature, than when they have been laid open to the varying influences of the variable air. Disease lowers the power of producing heat in the diseased tissue, or it causes heat to be produced in a fitful irregular way. An even *artificial heat* is therefore a strong means of renewing life. Where vitality is deficient throughout the whole body, we can economise it by clothing impervious to atmospheric changes, as woollen, silk, &c., and by avoiding linen, as in albuminaria among chronic diseases, and in acute rheumatism among acute. Where there is a local deficiency of vitality, as in pneumonia, pleurisy, pericarditis, peritonitis, ulcerated bowels, &c., none of our curative appliances are so important as a continuous poultice. *Warm baths* supply a large quantity of assimilable heat, which lasts for a considerable time, and hence, in certain cases, they are felt as a tonic. But they will only suit patients who are benefited by, or at least are not injured by, the absorption of a great deal of water.

Electricity supplies the contractile muscular fibres with a stimulus to action which is wanting in cases of deficient nerve-force. Hence it keeps up the habit of motion in paralytic limbs, prevents their getting atrophied, and sustains them in possible activity till such time as the injured nerve-force recovers itself. *Artificial motion* and *rubbing* act much in the same way. *Mechanical aids* to sight, sound, hearing, and movements, rightly employed, may come under the same category.

6th. *A temporary revival of deficient functions.* For example, the deepening of sluggish breathing by ammonia, valerian, ethers, and essential oils. This stimulation, though it may be

only temporary upon the organ directly acted upon, is therefore followed by a reactionary collapse; yet indirectly it contributes to life by the influence of the organ's functions upon other parts. Thus the deepening of the breathing, instanced just now, aërates the blood and strengthens the circulation, and so makes to the capital of life an addition which lasts long after the passing stimulus has lapsed into a corresponding degree of deficiency. Perhaps the permanent benefit of *warm bathing*, often so much greater than can be accounted for by the short increase of warmth, may be explained in the same way. *Alcohol* often acts beneficially in full doses at long intervals, in cases where its continued influence in smaller doses would be hurtful, probably on this same principle. But as a general rule, those stimulants are to be preferred for the purpose whose effect is more transient.

7th. *Increasers of absorption* are purely constructive medicines, provided that they are not increasers of destructive metamorphosis at the same time. *Vegetable bitters* brace up and harden the mucous membranes, as may be easily tried by their effect on the mouth. Hence exosmosis is lessened, and endosmosis increased. Thus digestion is made more rapid and effectual, more nutriment is taken up and quicker. Even in a healthy person the remains of the last meal are sooner disposed of, and the appetite for the next sharpened by a bitter. This is the pure action of a vegetable bitter; but a good many of the plants we use as such contain various matters which otherwise unfit them for our purposes in certain cases. Perhaps none exercise so few of these noxious influences and are more generally applicable than the products of the inimitable cinchona. *Astringents* also may reasonably have some of their beneficial influence on the digestive canal explained by their restraining the formation of mucus. When mucus is in excess, it doubtless interferes much with the taking up of nutriment by mucous membranes, and the checking its growth is an indirectly constructive act. Many of the vegetable bitter drugs contain tannin or other astringent constituents, and are thus peculiarly suited to the leucophlegmatic (or mucogenous) diathesis. These drugs are suitable not only for the digestive canal, but to other internal tegumentary membranes. Thus the renewal of life in the uterus and ovaria is very much aided by checking leucorrhœa with astringent

injections. The absent catamenia will often reappear while the weakening discharge is being thus arrested; and stagnant ulcers will form fresh healthy tissue, wounds will close, and abscesses heal after, nay, during the application to them of astringents. *Sulphate of copper* and *nitrate of silver* are most active in this way; but, as you know well from your experience as dressers, heed must be taken lest when destroying the mucus and pus-formation you also destroy the life of the adjoining tissues whose preservation is your care. Sulphate of copper is a most powerful internal medicine, as a reviver of health in ulcerated parts of the intestinal canal, and it also seems to act as a tonic generally to the digestive tract. Nitrate of silver would probably be equally useful, but unhappily it is too soon converted into the inert chloride by the salt of the secretions.

8th. *Excitants of the involuntary muscles which subserve absorption* are also constructives. Thus *strychnia* and *aloes* increase the appetite by hastening the passage of the alimentary mass, and this joined to their bitterness makes them tonics. But they both are better when aided by other tonics. *Succussion* stimulates these muscles, and so very gentle exercise promotes digestion, but violent muscular exertions arrest it, because they engage the nervous energy elsewhere.

There are certain drugs which, in a manner as yet quite unexplained by physiology, appear to alter towards health particular tissues. They are not constituents of the body, nor do they seem suited to take the place of constituents of the body, nor do they cause any evacuation of retained effeta, nor do they apparently act on any of the healthy organs. *Iodine* and *bromine*, for example, have this effect on the white fibrous tissues, and as they originate renewal, I can hardly help classing them among constructives.

With DESTRUCTIVES our forefathers have left us well acquainted. Time out of mind the world has had long lists of drugs, classified according to the organs through whose gates they disgorge the products of metamorphosis. "Sudorifics," "purgatives," "diuretics," "expectorants," &c., are familiar to both doctors and the unlearned; while others, as mercury for example, are known

as general "liquefacients," promoting destructive metamorphosis universally, and a consequent increase of solid evacuation from all quarters. And other expedients again, such as bleeding, are a direct mechanical abstraction of a part of the living body.

The uses of Destructives are the following—

1st. *To remove from the system effete matters which are toxically noxious to healthy life.* Nothing does this so universally as *water.* The biliverdin which we see staining the skin in jaundice, and which indicates also the presence of the more injurious biliary acids, may be removed by *mercurials,* by *podophyllin,* by *soda,* and, according to Dr. Harley, by *benzoic acid,* provided always care be taken that the passage for their exit is free, that the bile-ducts are not obstructed. So also uric acid may be eliminated from the blood by *nitre* and by some other neutral salts, when the kidneys are healthy and neither degenerated nor congested. In applying these remedies it is necessary to see clearly what is the effete matter we wish to get rid of, and to use the appropriate drug. No labourers in the present field of materia medica deserve so well of the world as those who inquire into the real intimate working of medicines. Our chemists' shops are quite full enough, and it adds much more to true useful knowledge to make a single step towards explaining the action of one established remedy, than to add a hundred even active articles to the pharmacopœia. One would be glad to know in the case of each eliminating drug which of the effete constituents it most readily acts upon. Thus much milder drugs might often be employed, which would go straight to the point, instead of having some violent but perhaps unnecessary action joined to them. Do not let us be satisfied with the nomenclature of "purgatives," "diuretics," "sudorifics," if it is possible to discover what it is they purge out, what constituent is specially removed through the kidneys and what through the skin by the augmented secretion.

2nd. *To remove mechanical impediments to normal excretion.* The proviso which I made just now in the case of the liver and kidneys, namely, that there should be nothing in their structural state which can impede the flow of bile or the urinary constituents, reminds us of another use for destructives. For example, leeches on the right hypochondrium will often restore a flow of

bile, in diminishing a congestion of the hepatic tissue by which its formation may be stayed. Cupping the loins will act as a diuretic by relieving congestion of the kidneys after scarlatina or other cause. Leeches to the anus, or artificial hæmorrhois, will empty the stagnant portal circulation, resuscitate its activity, and by this means enable medicines to be absorbed and food to be digested. General bleeding will at a great expense to the system, and not perhaps more readily, effect all these objects at once. The advantage of venesection to our forefathers was that it did not require any accuracy of diagnosis of the organ to be attacked, but made a general assault on all together.

3rd. *The removal of impediment to absorption* is another good reason for the administration of sundry destructive medicines. This is often merely a question of mechanics, and if we could apply mechanical means to the required locality, they often would do better. Such for example is the removal from the stomach and intestinal canal of mucus, whether peopled with parasitic worms or not. Mucus is in itself peculiarly insoluble, and therefore indigestible, and it also firmly resists diosmose: thus its presence stands in the way of the absorption of nutriment by the digestive membranes. It is not easy to rid the patient of these incumbrances without abnormally augmenting destructive excretion, but if it can be done we should be glad to do it.

4th. *The removal of systemic poisons which are the cause of disease* by destructives seems shown to be possible by the effect of mercury on the syphilitic virus. The body is endowed with power to gradually eliminate this virus, and after a course of diseased states of long, perhaps years-long duration, to return again to health. Indeed if it had not this power, remedies would be useless; for drugs, though they can arouse sluggish capabilities, can bestow none not originally inherent in the nature. The natural elimination, tedious always and perhaps sometimes otherwise impossible, is, according to Mr. Lee and other experienced syphilographers of late years, much quickened by mercury. Mercury does not, like sarsaparilla, bark, iodide of potassium, and other constructives, benefit by curing the diseases caused by the virus; it aids the system to destroy the virus itself. That it should do so is not surprising when we see its

wonderful destructive action on animal tissues; how they become softened and blanched and dwindled in decay when the system is saturated with the drug.

Were there any other chronic diseases so indubitably kept up by the obstinate adhesion in the system of a morbid poison, it might be worth while to destroy the poison in the same way. It might be worth while to submit to having the healthy parts of the body scotched, for the sake of prematurely killing its baleful guest; but I do not think we can find another instance among maladies common enough for us to be well acquainted with their pathology.

In acute fevers dependent on organic poison the system casts it forth so quickly that sometimes danger is borne of its very haste and effervescence. We should be at no pains to hurry the process, did we possess the capability of doing so. Under the same restrictions as morbid poisons comes the removal of independent parasites, such as lice, itch acari, the fungi of favus and pityriasis versicolor, of dead or incurable parts of the body which react upon and become the causes of diseases, and of foreign matters generally. We must balance the injury we may be obliged to inflict in removing them against the good done by such removal.

A free review of the rational reasons for using destructive treatments in the cases I have given as examples, will confirm the universal rule that they are never to be employed for their own sake, but only to either make room for, or to give play to, constructive growth.

Arresters of constructive life, as such, can scarcely come under the denomination of medicines; physicians never wish to stop growth in human patients. As poisons we do use them on animals for certain purposes of our own: alcohol is given to puppies to keep them small dogs; and it is stated that dwarf-like jockeys have been produced by the same treatment. We have thus a warning of what the effect of the agent is.

The same article of diet, however, appears in another light as an arrester of destruction. We not seldom wish to stay the process of vital decay in our patients, and are provided with a

means of doing so in alcohol. In a lecture published some time ago* I explained the reasons for thus viewing alcohol, and went into details of the circumstances which should guide and govern its administration; so I will not repeat them now. I there classed it as an anæsthetic, whose primary action is on the nervous system, and attributed to that action its effect in staying destructive metamorphosis.

Our other more generally acknowledged anæsthetics have a similar action; they prevent the wearing out of the body by the painful and destructive functioning of the nervous system during disease.

Why is the functioning of the nervous system during disease painful and destructive? It seems to me that M. Chossat's experiments throw some light on this obscure subject. The nervous system is the "*ultimum moriens*"—the member of the body the least affected by vital decay, that upon which starvation, deficiency of life, disease, have least decomposing influence. It remains therefore energetic, sensitive, and motive, whilst the others become deadened and sluggish. Thus the due balance of the functions is overthrown. By a restriction placed upon the normal but inconvenient force of the nervous system we get a state more like to health, by reason of its nearer approach to balance, and guard the tissues against the disorganizing tendency of its abnormal disturbance.

The same aim of restoring the balance may be effected by raising the depressed vitality of the non-nervous deficient functions. And where this can be done, of course it is the best treatment. Where means of accomplishing such a desirable object are wanting, anæsthetics are the next best resource. Just

* Lecture XLVII of this volume. I would take this opportunity of saying that the lectures are not placed in the order in which they were delivered. Clinical instruction is, or should be, given as the cases occur; so that the student should come fresh from the bedside observation of the patient to the deductions made therefrom. Introductories, however, at the beginning of each session, afford a legitimate opportunity for a systematic statement of principles, for going back to the abstract truths which are the result of previous practice and experience. To the reader it is convenient that these should come together at the onset; and the sequence of time being thus disturbed, I have preferred to set the rest in a sort of natural order, putting together those which seemed to have most bearing on one another, rather than to arrange them chronologically.

as in machinery when a wheel has got worn and inefficient, it is best to put in a new one, if possible; but where we cannot, we slacken the steam power—*quod opibus deest, arte sarcimus.*

Is pain the expression of the want of balance I have spoken of, or is it only a co-ordinate phenomenon? Certain it is that pure pain, such as neuralgia, is relieved either on raising the vital functions with food, tonics, &c., or on blunting the nerves with anæsthetics.

Remark now that destructives and arresters are not in any case final treatment; the end is in every instance reconstruction or renewal—an aim which must be kept in view in all the physician does or counsels.

These principles of therapeutics I make it the business of my clinical lectures to enforce and illustrate by the examples of disease which you are at the moment seeing under your eyes. But do not suppose these examples to be picked examples—cases selected to prove my points: no—each one of my patients in the wards teaches the same lessons to all, at least to all those who are willing to be taught by nature rather than by books. Let me entreat of you not to neglect the opportunity which is afforded by our liberal public charities and the independence of your pupilage to learn truth, and then you will not fail in after years to practise truth.

LECTURE III.

THE FORMATION OF MUCUS AND PUS.

Office of mucous membranes—The identity of mucous globules and nascent epithelium—Self-supported growth of mucous globules—Similar to organic growth of a parasite—Is this form of life an excess or a deficiency of normal life?

(*First Lumleian Lecture at the College of Physicians, Lent,* 1863.)

The subject which I have chosen for these Lumleian Lectures is one which must be interesting to physicians above all other observers of nature. A physiological Fellow of our College was in the habit of reckoning his patients as so many "mucous membranes." On his retirement from active practice he said, "I have taken my last fee from my last mucous membrane." I do not think his term was an exaggeration, for in very few indeed of the cases ministered to by us has not either the cause of the death acted on the body through these integumentary coverings, or manifested its action by a perversion of their functions. A great majority of our drugs are intended to act on mucous membrane, and all are introduced into the body through it. We cannot therefore but be grateful to those who have endeavoured to add to our knowledge of its nature and habits.

The term by which it is conventionally designated is apt to lead the most thoughtful of us into a fallacy. Active members of society are named after the work which is their most important occupation. The industry of the lawyer is the administration of the "law;" the doctor is most efficient when he is most "learned;" the duty of bishops and overseers is ἐπισκοπεῖν, "to oversee" each their several departments. But

the office of mucous membrane is *not* to secrete mucus. It is most active when it is not doing so, and its activity is decreased just in proportion to the copiousness of the mucus. Typical health certainly consists in its absence; many robust people pass weeks without expectorating; many find their handkerchiefs clean and unrumpled after being days in their pockets, in spite of all the artificial and accidental irritants to which the Schneiderian membrane is subject; and the urinary and intestinal canals contribute only an infinitesimal quantity, which may fairly be attributed to a temporary departure from health of some fraction of their large area.

The business of mucous membrane is to offer a passage for oxygen, water, fat, albumen, and other nutrimentary substances, and to defend the less easily renewed tissues beneath it from the deleterious action of external agents. These functions it best fulfils when it is bedewed with a moderate watery exhalation, and not with mucus.

This exhalation is transparent and watery, and possesses nothing of that stringy adherent character by which we ordinarily recognise the substance known as mucus. It carries out with it the epithelium scales shed or moulted from the surface; and these scales are consequently found in the excretions; but it is itself absorbed again as quickly as it is exhaled, and does not contribute to the substance of any of the ejecta of the body. The typical healthy condition of a mucous membrane may be considered to be a constant dampness without visible fluid, and a moderate and gradual shedding of epithelium.

Shed epithelia are found also in mucus, but not as a peculiar characteristic, nor modifying its physical properties. Its most obvious characteristic is the presence of transparent bodies, apparently of a gelatinous consistence, of a more or less rounded or oval form, and with one or more nuclei, seemingly of a less transparent consistence, in their interior. But its physical properties of consistence and adhesiveness, which so peculiarly distinguish it from all other transparent fluids, seem to be derived from the medium in which these globules are placed. This origin may be inferred because similar globules, quite undistinguishable in appearance and behaviour, constitute also the bulk of pus, a fluid of quite distinct attributes and properties.

There are probably no observations more suggestive and luciferous to rational medicine than those contained in the paper of Henle published about a quarter of a century ago in Hufeland's Journal. It is an excellent example of physiological reasoning, and later observation seems to set the matters of which it deals beyond reasonable doubt.

Professor Henle's argument aims, successfully I think, at tracing the globules which are seen in mucus under the microscope to that substance which in the normal state of typical perfection would form epithelium. They appear to be young epithelium arrested in its growth, and prematurely moulted off from the body. The condition which produces them is an arrest of development.

To feel the full force of the experiments and observations which confirm this view, it is necessary to see the connecting links of resemblance which run through the course of the integumentary membranes. We must pass over for the nonce the differences which fit for their various uses the external skin, the covering of the tongue and mouth, the secreting lining of the stomach, the absorbing lining of the intestines, the defensive coats of the bladder, urethra, rectum, &c. We must look upon them as one whole. Just as the skin clothes the muscular framework of the body, moulded on the form of the skeleton, so the mucous membrane lines the internal canals, pits, and galleries, following their intricate windings throughout. And for exactly the same purpose—namely, to be a defensive medium of communication between the individual being and the outer world, between the microcosm and the megalocosm, in all their chemical and mechanical relations to one another.

For the fulfilment of this common duty they have a common structure. Strip off a piece of epidermis, and you find that its outermost layer consists of flat polygonal scales pressed close together and united both by the edges and surfaces so as to form a continuous leathery tissue. They are welded into one fabric like the exposed part of an old macadamized road. But just as, when you pick up the surface of this road, you expose a deeper layer of stones loose and separate, so beneath the scarf skin you find what Malpighi, with philosophical prescience, called

the *rete mucosum*. This consists, like the scarf skin, of separate corpuscles, which, like the stones of the macadamized road, become looser in structure, less adherent, and less similar to the upper layers as you go deeper. The superior corpuscles are, indeed, flattened, and exhibit a flattened nucleus enclosed in a clear cell as an epidermoid scale. But as you get nearer the cutis the nuclei are rounder and rounder, and the transparent area of the cell is less and less visible; until at last, on the cutis, the corpuscles are seen to consist of only granular masses. These granular masses are identical with those seen in mucus.

Just in the same way the mucous membranes are clothed with epithelium, loosely scaly in some parts, welded together like a macadamized pavement in another, columnar in another. And when this is stripped off or injured, there are brought into view floating granular masses of various sizes, which constitute what are familiarly known as "mucous globules." They are exactly identical with the inner strata of the epidermis, the *rete mucosum* of Malpighi.

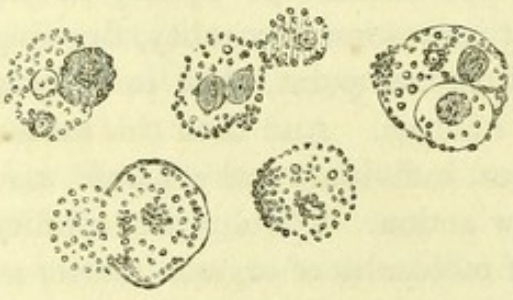
What are these globules? Are they something special, belonging to special tissues, and appearing only under special circumstances? Or are they a form of organic matter common to other parts also? Are we to apply here the Baconian myth of Proteus, and look for their *natura naturans* as exhibited elsewhere in various shapes? I think it is philosophical to do so.

The appearance they have is that of all matter when it first puts on life. The telescope and the microscope equally reveal to us these nebulæ as the earliest indication of vitality, drawing the surrounding chaos towards a central point, then exhibiting that central point as a kernel or nucleus. And then this kernel becomes the parent of new centres, individual and separate, and these again starting places of new action. The dawn of vitality is exhibited in the coalescence of molecules of organic matter so as to form nuclei, which, under favorable circumstances, develop either separate cells or tissues.

Up to this point each focus of life seems to be a separate individual. It takes in nourishment by its innate power from without; it increases in size and alters in shape. And this alteration in shape seems principally to take place from within.

It is not merely an aggregation outside of new molecules, but a plastic change of internal appearance. Nay more, it possesses the faculty of giving birth to an individual, and so to a succession of individuals, like itself. No better evidence of automatic existence can probably be given.

These phenomena can be seen without much difficulty in the globules of mucus. That which answers best is what we often expectorate in little semi-transparent gelatinous lumps from the bronchi in the morning after exposure to night air. This must not be mixed with water, or be allowed to cool, but kept at the temperature of the body, and put immediately under a lens of as high a power as you can command. Dr. Beale showed me the phenomena first under a 24th, but I have seen them very well under an 8th inch in an old-fashioned Powel's microscope. Keep your eye fixed on one nuclear mass, and you will often see a gradual change in its appearance. First a clearer nucleus appears in it; then, as you gaze, two, three, or more smaller nuclei. Then the fine granular specks in its sides coalesce into a nucleus. Then you see that it has a bulge in its side, and that a nucleus forms a bud, and then has a constricted neck or stalk. And then, perhaps, if you are lucky enough to get the mucus in motion without losing sight of your object, the bud may float off as a separate globule. Or the whole globule may divide into two, each with a separate nucleus, as I have tried to represent in this drawing from life of five globules in this state of transition—



A temperature below that of the body seems to check this development, but you may often keep it on by means of a spirit-lamp. The globules in which I have seen it take place are those from the trachea, from the os uteri, and from warm freshly-passed urine in cases of inflamed bladder.

When the fluid has got dried up by the heat thus constantly applied, you may in some degree restore its activity by moistening it with a viscid animal fluid, such as saliva. The greater part, indeed, is broken up into molecules, and these show no

disposition to unite into globules, but among them will remain some globules unbroken, and these will again form new nuclei, and bud as they did at first.

Is this organic growth? Or is it the aggregation into visible masses of particles already existing, like that which Mr. Rainey has described as taking place in mineral matters? Is it a mere coalescence, or something more? I must say that to my mind the production of an individual like itself, capable again of reproducing another individual still resembling the grandmother globule, is identical with organization. And I think, too, that the multiplication of the nuclei inside is quite unlike any sort of coalescence, which would add matter to the outside, like an urinary calculus or an avalanche.

It seems to me that each of the globules contains a centre of life, into which the pabulum passes from the outside, nourishing them and giving them means to increase in number. This would account for the enormously rapid collection of mucus filled with globules on inflamed membranes, even on membranes which in the healthy state shed very little epithelium, or have but one layer of it, as in the bronchi, and therefore cannot be supposed naturally to form much young epithelium. The first parent globules may be aborted young epithelium cells, and these may be the ancestors of others which form the bulk of the mucus, begetting them with the extreme rapidity characteristic of generation in low organic life.

If this be true, mucus may be viewed as a parasite, receiving from the body its nutriment indeed, but not its form nor its claim to vitality.

Doubtless the growth of mucus is most rapid where there is normally a thick layer of epithelium, and where a large growth of young epithelium is constantly being formed to replace the rapid moulting. But still it is much quicker on localities with a thin layer than could be accounted for by each globule being an aborted scale; there could not be enough aborted scales to furnish so much mucus so full of globules. I believe, therefore, that it grows on the surface by their budding and splitting in continuous succession.

If you compare pus which has been some time accumulating on the surface of a mucous membrane with that which is being

freshly formed, you will remark a decided difference in the globules they contain. Take some accessible mucous surface—the eye, or the vagina, for example—thickly covered with opaque secretion, and you will find the globules nearly all of a size, even and spherical. Then wash it clean with cold water, and examine the first-formed secretion: the globules are of all sizes and of irregular shapes, oval, bulging, budding, with or without nuclei. This seems to indicate a general change of form by time—a certain completion of creation in that which has been longest formed.

When we see, as I have described, the globules of mucus budding, dividing, and subdividing in active haste—new foci of independent vitality generated and multiplying even when separated from the body—it might appear that a local increase of life was being exhibited. Certainly a greater bulk of living substance is formed by a membrane secreting mucus or pus, than is the case in the healthy state; for the secretion outweighs by a hundredfold the daily quantity of epithelium which its original material was destined to make. But what sort of degree of life is exhibited by this secretion? Is rapidity of multiplication to be looked upon as evidence for or against force of vitality? Against, I think. The lower we go in the scale of creation, the more quickly and the more copiously do the living forms representing the various classes reproduce their kind. The less functions and force and intensity of existence they have, the more prominent becomes reproduction as the main object of their being created. This seems to be the universal rule, to be traced all through living beings till we get down to the Amœba and the mould, in which no trace of a function can be detected beyond the multiplication of their simple substance.

Here, indeed, it becomes difficult to draw the line between organic and inorganic. Instead of being in contrast and in conflict with the physical force of inanimate nature, vitality seems to obey laws which closely resemble them. The main point of distinction seems to be the growing from a centre outward of organic, and the aggregation towards the centre of inorganic, individuals.

When organic matter destined to form part of an animal has

attained the end of so becoming a member of a consistent whole, it ceases to multiply itself. Cells do not normally go on splitting up and producing cells similar to themselves in situ. The highest development of their vitality is ceasing to exist as growing matter. A fully-formed epithelium scale does not produce another scale, nor the nucleus of a muscular fibre another nucleus. The retention of reproductive force is an expression of the lower and an exclusion from the higher functions of life.

In the mucous globule, then, we find organic matter, whose destination was the formation of epithelium, arrested in its development when it has attained only the lowest degree of life—that lowest degree of life being the function of reproduction.

LECTURE IV.

THE FORMATION OF MUCUS AND PUS.

Mucous globules not cells, but nuclear matter—The representative of the cell is the medium in which they float—It is therefore not likely to retrogade into globules—Formation of pus from mucus—How does pus appear on the surface?—Observations of several observers—Passage of globules through epithelium—Pus-globules not descendants of epithelial cells, but parasitic formations inside them—Epithelium semifluid—Breach of epithelium in some cases—Growth of pus.

(*Second Lumleian Lecture at the College of Physicians, Lent*, 1863.)

I DESCRIBED in my last lecture the mucous globules forming nuclei in its centre, and these nuclei splitting up into two or more, subdividing and separating the whole globule into several. From this it has been inferred that it is in this way that the globules grow—that they are, in fact, cells which multiply by subdivision. But I described also the formation of buds at the side of the globules. These buds commence by the granules of which the mass of the globule consists becoming gradually more visible and distinct, and forming centres of growth distinct and separated by a conspicuous interval from the central nuclei. They are not derivatives from the central nuclei, but new starting-points of growth. This is important, because it takes the globules out of the category of cells. In a fully-formed cell it is only the nucleus, and not the transparent area of formed matter, which grows; whereas here the whole substance grows and originates growth. The globules are, in fact, nuclei. Or we may more properly call them "nuclear matter;" for a nucleus must be a nucleus of something, whereas these are

nuclei of nothing. Nuclear matter is that which is fitted to be the nucleus of something, unless arrested in its development —in other words, organic living matter in a condition to grow and multiply. A confirmation of this occurs in a drawing by Dr. Beale. When tissues are steeped in a weak solution of carmine, the only parts which receive a permanent stain are the nuclei, or young growing matter in them. Now, of the mucous globules the whole substance receives a permanent stain, as is shown in the drawing here exhibited. It appears therefore to be wholly formed of nuclear or growing matter.

It may be remarked that the mucin, or transparent fluid medium in which the globules float, does not receive so marked and so permanent a stain from the carmine; and this appears a very fair argument for considering it as the formed substance of which the globules are the nuclei—a sort of common transparent area, a common cell-wall to numerous nuclei; just as coral is the common skeleton to millions of coral insects. Each perfect epithelial scale, each nucleus, has its own formed substance constituting its own cell-wall; in the lower grade of life represented by mucus there is a less perfect common formed substance, constituting a common cell-wall.

Now, if the mucin, or transparent medium in which the globules and granules float, stand in the place of fully-formed organic substance or cell, it will not retrogade into the condition of growing substance. Such a retrogression does not happen in cells. In an epithelial scale, for instance, the transparent area does not become nuclear matter. But it transmits the nutriment to the nucleus inwards through its substance without being destroyed. On this supposition, the formation of mucin will be the highest development of the life of the globule, for it answers to the formation of tissue from nuclear matter. And in that case we should expect to find that the nearer its normal condition the morbid secretion can be collected, the more of this higher state of life it would exhibit, and that the further from its normal condition it is, the less there would be of the formed matter. Such is the fact. The fluid which first forms on an inflamed surface contains few globules and much stringy transparent medium. Its nuclear matter has so far departed from life that it cannot form separate

cells, but only an imperfect common area. But as the inflammatiou goes on, this power is still more and more lost; the nuclear matter cannot form the mucin, it can only multiply; and hence the stringiness of the mucus disappears, and it becomes what we know by the name of "pus." As far as the morbid matter itself is concerned, pus indicates in it a further deficiency of vitality than mucus—a deficiency of vitality shown first in its internal self-multiplication, and secondly in its non-production of mucin.

The question naturally arises as to how these products of arrested vitality make their way to the surface of the mucous membrane where we find them. The pabulum whence they are developed lies on the inner side of the epithelium, whereas we find them quite uncovered. The first explanation that occurs would be that the epithelium is destroyed, and that they are in the first place the *débris* of the dissolution, united to that which would normally go to form it. This would, in fact, be a modification of the old idea, that pyogenesis was a kind of ulceration, and involved a certain solution of continuity in a tissue. Indeed, it would amplify the idea, for it would extend its application to mucus as well. To this idea Professor Virchow seems to incline in the edition of his 'Cellular Pathology' published in 1858 (p. 395), where he represents the formation indeed of the mucus and pus-globules to take place in the lower layers of the epithelium, but to be mixed with and to have their bulk added to by the outer layers which they push off.

Since then, however, several observers have found that the most intense catarrhal condition of mucous membranes may exist without any loss of the superficial epithelium. Even in that most destructive state commonly known as diphtheritic inflammation, where fibrin is thrown out with the pus, the epithelium may be perfect. Dr. Sanderson has kindly lent me some notes he made of the autopsy of a child who died at St. Mary's Hospital of diphtheric angina, in whose larynx this fact was very clearly seen. The whole interior of the organ was lined with a firm, closely adherent false membrane. When that was detached, portions of flabby concretion still remained, which could be washed off with a stream of water. "On ex-

amining the surface," says Dr. Sanderson, "after much washing, it was found to be *entire*. It exhibits to the naked eye, indeed, marked inequalities of appearance, as if eroded; but these must be dependent on the adhesion of minute particles of concretion; for, on making snips of the surface with sharp scissors at those parts where the eroded appearance was most obvious—viz., on the upper surface of the epiglottis, the epithelium was found to be entire. The only exception was at the upper margin of the ventricles, where the epithelium was adherent only here and there; but there was no trace of thickening or alteration of the basis-membrane, which exhibited its normal appearance."*

Förster† has also carefully examined, by both horizontal and perpendicular section, the epithelium of mucous membranes in a state of purulent catarrh, and has found in it either no change or very unimportant change from the normal state.

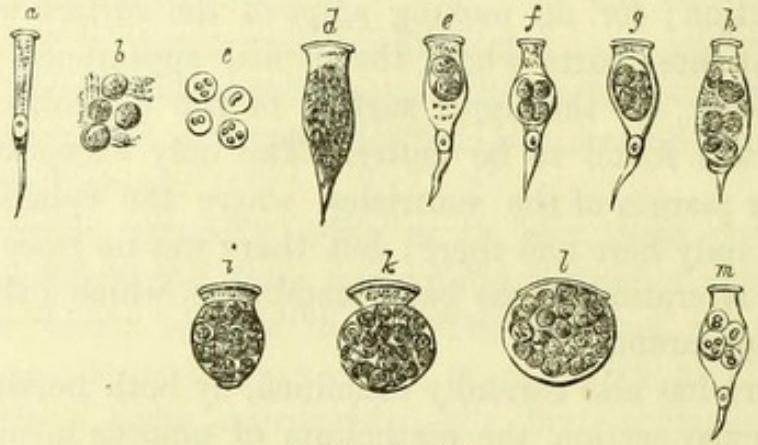
The globules, then, or the material of the globules, must somehow be passed through the epithelium. Dr. Buhl, of Munich, has lately detected it *in transitu*, and drawn figures of it on the road. The case on which his observations were made was one particularly well suited for the purpose. The patient had died of pyæmic inflammation of the portal vein and of the bile-ducts of the liver. Now, the epithelium of the bile-ducts presents a very marked character; its cylindrical bodies exhibit an unmistakable shape. So obvious is this shape that it can be detected even when considerably distorted; and therefore he was able to trace the epithelium scale, modified by what he rationally enough concludes to be the presence in it of pus-globules. This is clearly exhibited in his sketches of the various forms or stages of altered epithelium as he saw it floating loose in the fluid pus or massed into clots. First, he shows the normal epithelium cylinder, as a medium of comparison, and of these there were great quantities. Then come a number of bodies which we can recognise, when they are here placed in a row, as perversions of the cylinder, gradually increasing in rotundity and receding in likeness; but which in their extreme of dis-

* Private Notes of Dr. Sanderson.

† Communication from the Würzburg Institute of Physiology and Anatomy. 'Würzburger Med. Zeitschrift,' bd. i, part 2.

similarity would not be seen to have any connection with it except by a previous knowledge of the fact.

Fig 2.



(*After Buhl.*)

The majority of the enlarged cells were filled with oil-granules. Others, in which the fat was accumulated to a smaller amount, contained from two to ten rounded bodies exactly like the free pus-globules surrounding them—so like, that hardly any doubt could be entertained that they were cells pregnant with pus-globules. As a rule, the groups of pus-globules lay close to the thick end of the cylinder; but often between the thick end and the groups of pus-globules there was to be seen a degree of constriction, making the cell bottle-shaped. Sometimes the tail of the cell was obliterated or torn off, when it was almost globular, but even then capable of recognition.

In cells where there were only two or three globules the nucleus remained distinctly visible and perfect. In others the granular globules seemed to be dividing and splitting up into four or six, the original nucleus of the cylinder still remaining visible. So that pus-globules evidently do not of necessity take their rise in the degeneration of nuclei of existing tissue.

In other examples, again, the cell-contents seem entirely to have degenerated into fatty molecules, whether from the growth of the globules just described or from other causes, and in them the nucleus had degenerated along with the rest of the cell.

I have noticed in the epithelial scales from the vagina, in cases of purulent discharge, a somewhat similar repletion with

granular matter without alteration of the nucleus. And mixed with them there were also large round granular corpuscles, which had the appearance of containing pus-globules, and which might have been degenerated epithelial scales. But scaly epithelium has not such a definitely marked form as the cylindrical variety, and it is difficult to identify it in a state of transmutation.

Remak* has also found in the pus from inflamed bladder large cells which he thought he identified as the epithelium from the fundus vesicæ. These contained from six to fifteen globules, entirely filling up the interior, and in every respect like mucus-corpuscles. But he does not trace a series of transitional forms.

It will be seen by these observations that the pus-corpuscles are not so much descendants of the epithelial cells as what may be called parasitic formations within them. They are parasites inside the epithelial cells, capable of increase by propagation within the tissue, just as on the surface the mucous globules were shown as parasites capable of increase by propagation without the tissue. And they grow quite independent of the true nucleus of the cell, and are not derived from it. Thus the nuclear material may pass through the substance of the epithelial coat of mucous membrane without destroying it, and not only be itself unaltered, but may increase in quantity during the progress. This is one way in which the pus-material may reach the surface, and explains those cases in which the epithelium is quite uninjured.

We find these fluid or semi-fluid properties exhibited by epithelial cells in their daily duty of absorption. Fat, from its highly refractive powers, can easily be traced, though a fluid, by the microscope; and fat in globules can be seen passing through the substance of the epithelial cells of the intestines during their active state. This is well shown in some recent drawings, made by Balogh,† of intestinal epithelium during the ingestion of fat; the whole thickness, not a central tube, but the whole thickness of the cell, is seen permeated by it, and allowing it free passage. The physiological passage of fat-globules inwards may reconcile us to the idea of the pathological passage of pus outwards.

* Virchow's 'Archiv,' bd. xx, p. 198.

† Moleschott's 'Untersuchungen zur Naturlehre,' bd. vii, 6tes heft.

But Professor Henle well says: "If they are sometimes formed in the interior of a cell saturated with their material, this fact does not exclude the possibility that just in the same way they may sometimes be developed from the same plasma beneath the cells." In such case they would be projected on to the surface between the separated epithelium cells.

This other mode of growth and attaining the surface is strikingly shown in a drawing by Dr. Edward Rindfleisch, of Breslau,* which exhibits in section the nictitating membrane of a frog affected with a partial catarrh of the eyes. Fig. 3 is the normal state, where the *membrana propria* (as Professor Henle calls it) is seen as a moderately transparent layer, with

Fig. 3.

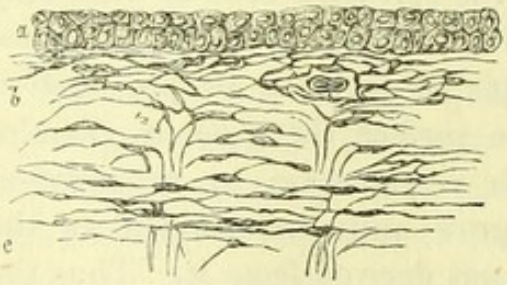
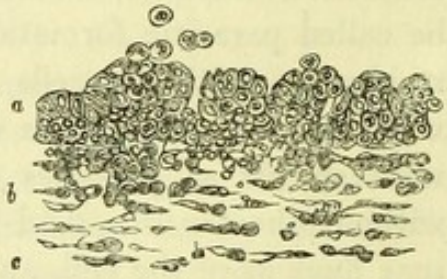


Fig. 4.



After Rindfleisch.

its delicate areolar-tissue-corpuscles, and the epithelium as two parallel rows of equal-sized cells. In Fig. 4 the pathological condition is represented: the pavement of epithelium is thrown up and separated by nucleated pus or mucus-globules, which are seen to proceed from the membrane beneath. And the substance of this membrane appears to be saturated and rendered opaque by what must be an earlier condition of the same bodies.

These observations seem to show that the pus or mucus globule on mucous membranes is the material of young or renovated epithelial cells, arrested in its development at the earliest dawn of life, before it has assumed the form of a cell, when it is almost as unlike its destined final form as an egg is to a chicken. They seem to show that in this state it may be thrown directly off by the epithelium being broken, or it may pass into the substance of the epithelium. In either case it does not part with the low degree of life it has acquired; but neither

* Virchow's 'Archiv,' bd. xxi, plate viii.

does it acquire a higher degree; it goes on propagating, but nothing more.

Both Buhl's and Rindfleisch's observations seem also to prove that pus-globules are not produced, or at least not produced only, by the degeneration of existing cells; they are not tissue retrograding into a lower form of life like fatty, amyloid, and similar morbid matter. Buhl's drawings especially exhibit the nucleus of the epithelial cell intact along with the newly-formed pus-globule. They differ, however, in one particular, that whereas according to Buhl the first pus-globule produced free in the cell increases itself by division, Rindfleisch assumes a splitting up of the whole contents of the cell according to the analogy of the egg-yelk. As Buhl's observations are made upon epithelium alone and Rindfleisch's upon areolar tissue also, and in one case the epithelium remained perfect and in the other was broken up, I can see no inconsistency in allowing both to be correct, and to represent the different behaviour of growing matter under different circumstances.

A very ingenious place has been selected by Junge* for the investigation of the growth of pus—viz., the tunic of the aqueous humour in the eye. He caused inflammation by the application of a hot wire to the cornea of an animal, and was thus able to see what went on in the deeper parts of the eye without exposing the affected tissue to the air or any other extraneous agency. He was thus able to see the active growth of globules by division and subdivision so far as the formation of large masses.

As the secretion on the surface of mucous membranes becomes more opaque or "purulent," so the globules are more and more regular in size, rounder, and more like one another. In transparent mucus most of them are oval, with nuclei indistinct and various in number, while there are often lumps on their sides distorting the form. In creamy pus they are nearly all of a size, and present two or three well-marked nuclei. This is easily accounted for, if we admit that they are multiplied on the surface of the membrane. When first formed, they appear under violent and varying circumstances, different in degree every moment, and therefore are different in form; but

* 'Uber Eiterbildung,' &c.: 'Archiv für Path. Anatomie und Physiologie,' bd. xxii, heft 1, 2, p. 193.

when once separated they may go on multiplying under favour of nutriment and heat for several generations. Thus, like wild races of animals, they lose individual differences, and become more and more similar and uniform in characteristics.

The formation of pus in deep-seated parts is, of course, not so easy to trace as on surfaces, and experimenters seem deterred by the difficulty of the subject. In all tissues where pus is found, its optical characteristics are the same as the fully formed pus of mucous membranes: it presents globules all nearly of the same size, and with a pretty even amount of nuclei. This is its complete condition; but what it is like immediately on its separation we do not know. We cannot trace it through a stage analogous to mucus.

Of its previous condition, however, we may form a shrewd conjecture. The same elementary substance which appears on, or rather in, integumentary tissues as the common material of the various kinds of epithelium, appears also as granular nuclei in other tissues—in the ganglia of nerves, in the brain, in the parenchyma of the liver, in the spleen, thyroid and thymus, &c. The same bodies occur also in the blood, where they have been termed "chyle-corpuscles" and "white cells." They are found in largest quantities in the most recently formed, most quickly growing, and most actively renewed component parts of the animal frame. In short, the most rational interpretation of this form of organic matter is that which represents it as the common material of all tissues in its earliest state of elementary life. And as that which was to have formed epithelium is cast off as the basis of the mucus and pus-globule, so that which was to have formed hepatic parenchyma, nerve, or areolar tissue becomes pus, perhaps through some unsuspected transitional stage.

In this account of organic forms in pus and mucus I have endeavoured to harmonise the contributions of several observers. I have done this mainly by omitting points of observation and deductions in which they differ from one another, and putting together those on which they agree. Their harmony also has been much assisted by translating into a common language the various terms in which they express the laws of life which their observations appear to exhibit. It is curious how often plain English reconciles difficulties.

LECTURE V.

THE FORMATION OF MUCUS AND PUS.

Mucus and pus compared—Grades of loss of vitality in mucous membranes—Exemplification of these grades in smallpox pustules—Practical deductions from the various points commented on in the three lectures.

(*Third Lumleian Lecture at the College of Physicians, Lent*, 1863.)

In the vitalised forms which they present, we may consider pus and mucus as identical; the pus-globule being merely the descendant more or less remote of the mucus-globule, and both retaining only that low degree of life which they originally derived from the body. The physical differences between the two depend seemingly upon the medium in which these vitalised forms are suspended. Neither in pus nor mucus are the contents of this medium constant in their proportion to one another; no two analyses of pus or mucus are ever the same.

Indubitable pus and indubitable mucus may be clearly defined as the two ends of a scale, between which there are innumerable gradations. The most transparent, stringiest, and least globular mucus consists principally of a peculiar animal matter, which is not albumen, though it closely resembles it. It is not coagulable by heat, and it contains more oxygen on ultimate analysis than albumen does. Sulphur also appears not to be one of its constituents. Until it can be found reducible to be considered a compound of some known intermediate substances, it is temporarily called "mucin." This word simply means mucus divested of those contents which are capable of another nomenclature and physical separation—as, for instance, epithelium scales, blood, the ammonia of decomposition, &c. The analyses

are well known, being reprinted in every work of physiological chemistry, but shed little light, for the obvious reason that the substance analysed is hardly ever twice the same.

Pus, on the other hand, contains a large quantity of albumen, and a large quantity of fat. A modification in the mode of the loss of health is characterised by the presence of fibrin, and certain forms of defective vitality by casein being also found. The inorganic constituents of both seem to be the same as those of blood-serum with some of its water lost. Our diagnosis, then, of the morbid secretions of the mucous membranes should be not absolute—not that such and such a specimen *is* pus or *is* mucus—but comparative, that it is *more or less* purulent, according as it exhibits a greater or smaller quantity of albumen; a fact easily ascertained by the degree of its coagulation by heat when diluted with water. And this is thoroughly practical and important, for it indicates the degree of loss of local vitality in the secreting membrane. Equally practical also and important is the observation of the presence of fibrin and its amount. In large and overwhelming quantities we are familiar with it as occurring in the most serious deficiency of life consistent with life at all which we find in mucous membranes; and there appears even in minor cases a close connection between its amount and the degree of deficient vitality or inflammation. During a severe cold in the head minute clots of spontaneously coagulating fibrin may be found in the secretion of the Schneiderian membrane, which, existing in large quantities, form the false membranes indicative of the serious poisoning of the system in diphtheria and croup.

The phenomena we see on the mucous membranes are a question of degree rather than of essential difference.

Loss of vitality, as shown in mucous membranes, seems to be exhibited in the following degrees:—

First there is an *arrest of function*. For example, from the impression of cold the Schneiderian membrane is temporarily deprived of its endosmotic force; it ceases to absorb the water which is condensed on its surface from the breath, and that water drips from the nostrils. Or the stomach or intestines, from mental or physical causes, are deprived of their power of absorbing and digesting the fluid matters presented to them,

and partially first excreted from them; and these fluids may pass away by diarrhœa. Or the skin is chilled, and shows its deficient vitality chiefly in the deficiency of its most prominent function; though it feels painfully, it cannot feel so delicately as it ought. In a vigorous person full life is soon regained: the nose recovers its natural degree of dryness; the intestines absorb again before the fluids have passed from ths body, and the temporary indigestion does not arrive at diarrhœa; the skin recovers its feeling after a temporary painfulness. But we know that our invalid patients, whose vitality is low, are not so easily reinstated. Catarrh of various parts quickly and readily follows the action of physical agents. It is probable that in this least degree of injury the capillaries are contracted in area, and consequently the rapidity of their stream increased, by the action of the nerves. This phenomenon is wanting if the injury is greater; in experiments upon animals the microscope does not detect it, if the reagent applied is powerful.

2. A greater degree of injury is accompanied by a loss of elasticity in the capillaries. Their dilatation, and the consequent retention and stagnation of the blood in them, is familiar to us all, in both the living and dead subject, as "*inflammatory congestion.*"

3. This stagnation may be in isolated spots complete; the blood-discs adhere together in rolls, as when removed from the body,* and block up the passage. Thus the arterial wave is obstructed in its course, and like an ocean swell shattered against a shore of rocks, becomes more evident to the senses as the well-known "*throbbing.*" It is shortened and sharpened, but there is no evidence that it is strengthened; indeed, the analogy I have cited, and the general fact of weakness being accompanied by quickened pulse, would seem to show that it is diminished in propelling force.

In the mean time there is an accumulation of that constituent of the blood which most resembles in appearance the element

* It is not necessary here to go into the question, so ably treated by Mr. Lister, as to the first origin of this evidence of death; whether the blood-discs adhere in consequence of their own idiopathic death, or in consequence of the withdrawal of the influence of the tissues, which normally keep them from adhering.

of young growing tissue—the colourless blood-corpuscles. The blood is dark, indeed, to the naked eye, but under the microscope is seen to be made dark by being filled with these pale bodies, possessing a high refractive power.

The loss of elasticity in the coats of the capillaries renders them more easily permeable by the contained fluid. Serum is poured out into the neighbouring parenchyma, and joins with the swollen capillaries in producing "*swelling*." The loss of vitality in the blood-discs may be so complete that their hæmatin is dissolved in the serum, and we get the surrounding parts stained with it—as for a short time in typhus fever, and for a long time in syphilitic eruptions. Or the blood-vessels may completely lose their cohesion and be ruptured, allowing of hæmorrhage. But in all this there is no new process, nothing which is not a direct deficiency of function.

In solid structures this effusion is followed by an endosmotic current of the watery part back again into the circulation, leaving behind it the more solid and coagulable constituents. On free surfaces, covered only by soft open epithelium, the water and salts therein dissolved escape, forming the fluid of the mucus. The elements of new tissue, being there very copious to supply the constant demand for growth, ooze out copiously with the serum, and constitute the mucous globules. They are wasted elements of new growth, not themselves a new creation, or evidences of superadded life.

How do these matters get through the coats of the capillaries? There cannot be holes for their escape, or else the blood-discs, which are the smaller of the two, would escape also. Doubtless this is one of the great riddles of physiology. But the art of drawing is in a certain degree responsible for some of the difficulty which it presents to our minds. When we have no means of correcting by our other senses impressions made on the eye, we are too apt to consider everything with an outline as equally solid. The necessarily hard outlines of the engraver express to us forms which may, for all the paper shows, be spheres of cast iron, whereas in truth they are as delicate as aërial clouds. Why may they not pass through tissues, mutually dissolving and dissolved by the materials of those tissues? Just as we see a stratum of fleecy cloud among mountains, or in Turner's

pictures, disappear when it comes to a stratum of warm air, and reappear in the same form when it emerges on the other side. To get just ideas of nature, we must look upon solidity as a comparative, not as an absolute, quality.

4. In a higher degree of deficient vitality the serum contains albumen and fat also exuded with it; and this mixed with the multiplied globules constitute the fluid we call "pus." The albumen and fat not only escape on free surfaces, but saturate also the tissues they escape through, making them more retentive of water than would otherwise be the case. Inflamed cuticle takes a much longer period to dry than normal cuticle. Langhans found that a piece of healthy rabbit-skin was crisp in three hours, but a piece of the same skin which had been inflamed during life took twenty hours to part with its moisture to the same extent.* It appears to be saturated with the nutriment which it has lost the power of employing aright.

5. Pus formed as I have described is a soft and greasy liniment, capable of shielding the part with which it lies in contact from foreign influences, which in their condition of lowered vitality would be noxious to them. It is more bland and less liable to decomposition than any artificial application; for, laid on the healthy skin, it causes less irritation than even water. But under certain circumstances it becomes what we term *ichorous;* and then it is corrosive, poisonous, and destructive to the neighbouring tissues. Now, this cannot arise simply by the chemical decomposition of the pus itself in consequence of retention; because in a good many cases (as in cancrum oris, for example) it has not been retained so long as usual, but is thrown off ichorous and irritating as it is formed. But you may observe that in all these instances of ichorous pus there is necrosis, mortification, ulceration, or some other form of actual loss of tissue. Tissue may be formed, as in granulations, but it is being destroyed at the same time with abnormal rapidity. I cannot but think therefore that the ichorous nature of such pus may be due to its saturation with the organic acids which are the results of the decomposition, not of the pus itself, but of the melting tissues. Wash away this irritating pus, clean the sore,

* 'Zeitschrift für Rat. Med.,' R. iii, bd. xii, heft 2.

and that which is then formed often is quite bland and benignant. As pus differs from mucus, so ichor differs from pus in the nature of its accidental fluid constituents.

The formation of ichorous pus exhibits a further stage of loss of vitality. The poisonous part of it seems to be peculiarly soluble, and capable of uniting with, and destroying animal tissues. Absorbed into the blood, it naturally destroys the vitality of the constituents of that fluid, causes it to coagulate in localised spots, and thus to give rise to the congestions and abscesses of pyæmia. When we reflect how easily ulcerations may arise in mucous membranes, and what an active surface they offer for absorption, we cannot be surprised at the frequency with which pyæmic abscesses follow slight injuries, such as operations on the bladder, crushing of calculi, typhous inflammation of the bowels—cases which seem of minor moment, but which certainly involve solutions of continuity, with consequent decomposition of tissue and the formation of ichor, in a situation very open to absorption.

6. The formation of fibrinous coats on mucous membranes I have already shown not necessarily to involve destruction of the epithelium. Is the loss of vitality which causes it to exosmose through the capillaries in the fibrin itself or in the walls of those vessels? Whichever it may be, such an exudation certainly is evidence of a great deficiency of life; and, moreover, by the mechanical impediment it throws in the way of the functions, usually leads to further deficiency.

These facts, so familiar to us all in our daily work, viewed thus in connection with one another, cannot fail to impress us with the feeling that the seeming activity of mucous membranes in diseases is in truth a descending scale of loss of vitality. And this feeling must, I think, have great weight in our therapeutical dealings with those diseases; indeed, I cannot imagine anything of more practical importance to physicians and their patients.

The influence of physical agents on mucous membranes which are throwing off mucus or pus, or are disposed to do so, is very different from what it is during their health. A degree of cold, which is borne with ease by them when in full vigour, causes a further arrest in their fuuctions, and heat is equally badly borne. The action of oxygen, as contained in atmospheric air, is to the

healthy tegumentary tissues invigorating and beneficial; but when their vitality is lowered, exposure to it kills them still further, and may even alone prove fatal to the patient, as we see in the instance of extensive burns.

I was lately much struck with the noxious influence of atmospheric air on the pyogenic skin in a case of confluent smallpox. At the period of the maturation of the pocks, when just preparing to begin drying up, they presented three grades, distinguishable by the following microscopic differences in their contents. In one sort the matter was of the consistence of thin lard, white and opaque. Examined under the microscope, it was seen to consist of epidermic scales, many of normal aspect, but some filled with granular matter hiding from view the central nucleus. In another sort the normal scales were few, the granular scales equalling them in number; but more numerous than either were pus-globules of various sizes and of irregular shapes, as if budding on several sides. In a third sort, taken from the very confluent parts of the eruption, there was nothing to be seen in general but regularly formed pus-globules of even size, and a number of highly refractive globules (of fat) among them. The fully formed pus was so copious that it overpowered the *débris* of epidermis, which was barely visible. These three classes of microscopic phenomena represented three grades of destruction which the skin had undergone from the effect of the variolous poison. In the first the epidermis was merely destroyed, and the materials for renewal were available for a new one. In the second to a slight degree, and in the third completely, these were converted into pus to a great depth. Consequently there was great risk of permanent destruction of the skin, or a scar. Now I found that the grade of destruction bore a direct ratio to the exposure of the various parts to the air. The most favoured situations were the thighs, abdomen, and tongue, where the pocks of the first or less injurious kind were very numerous. Next came the legs and back, and then the hands and forearms. The face was the most purulently affected of all. The back (where the eruption was confluent) maintained its comparative immunity in spite of the cuticle being much chafed by the movements of the sufferer. You will notice that the most affected situations are those which are most exposed to

oxygen and evaporation, which are life to the healthy skin, but death to it when diseased.

On rational grounds, then, I think the practice of painting over the pocks in prominent and important situations with collodion, caoutchouc, or gutta percha may be fairly defended. In this way we do all we can to secure a local atmosphere of carbonic acid—the normal atmosphere of internal tissues,—and to prevent the loss of vitality in the covered parts.

More than this, I think we should be led to consider whether we do not sometimes err in applying too rigidly the theory of the universal wholesomeness of fresh air. Fatal cases teach us that it is bad for inflamed skins; is it good for wounds? is it good for abscesses? is it good for inflammed lungs? As physicians we have most to do with the latter case; and I must say I find that few things contribute to the ease and recovery of my patients, so much as limiting the supply of oxygen in the atmospheric air by saturating it with watery vapour. I refer here not only to pneumonia, but to all catarrhal affections of the breathing apparatus.

The stomach, again, is much benefited by carbonic acid. It naturally contains that gas, and some cases of deficient digestion appear to arise from its absence. Atmospheric air swallowed with the food, or by a pernicious habit, produces dyspepsia; and nothing benefits that dyspepsia so much as solutions of carbonic acid in water. Our soda water, potash water, and lithia water derive their main virtue from the fixed air they contain.

I believe that the only way in which carbonic acid is employed in surgery is under the form of yeast poultices, which certainly stay the progress of death in the skin quicker than most applications. Were I a surgeon, I should like to try the use of the gas in a purer form as a healing agent for wounds, operative or accidental.

Such an atmosphere of carbonic acid is to a certain extent secured to sore places by a layer of pus or mucus, which is saturated with that gas, and not very pervious to oxygen. It is a great defence against noxious agencies, and I think we are wrong to clear it away more than is necessary to comparative cleanliness and the patients' comfort. We know how much lighter gonorrhœa is in the female than in the male, and one

reason appears to be that the secretion is not constantly washed off the mucous membrane by the passage of the urine. Dirty people seem hardly to notice the existence of these discharges from the mucous membrane—they come and go of their own accord without causing any illness; while, on the other hand, cleanly patients are martyrs to their minor virtue and to their sensitiveness, protracting and aggravating disease by constantly removing the defence which pus or mucus presents against oxygen and cold. Of course an exception must be made of cases where the pus is ichorous and poisonous in its quality, when the sooner it is removed the better for the patient.

On the principle of not too frequently cleansing away mucous secretions I should attribute greater advantages than we are in the habit of attributing to opiates and other sedatives in pulmonary affections, where there is a copious bronchial discharge. Their obvious and immediate effect is to ease the cough; and some medical men are in the habit of speaking of that alleviation as if it were merely a convenient mask to conceal the morbid process which went on uninterruptedly. This easing of the cough, doubtless, takes place through the pneumogastric nerve being rendered less sensitive to the presence of the abnormal secretion, and so allowing it to collect in larger quantity before it is expectorated. I cannot but think this collection in larger quantities before expectoration is beneficial as a defence and as a curative measure.

The idea which I have endeavoured to inculcate, that an increase in the quantity of living tissues is by no means an evidence of an increase of their life or of their powers of life—nay, further, that it is rather an evidence of deficient life, cannot but have an important bearing on both pathology and practical physic. It is not a question of words, but of deeds. If inflammation be an abnormal increase of the vital powers of the tissues affected, then we cannot do better than employ the many agents which have a direct power of weakening life, a power which Boerhaave and Van Swieten believed was the only one the art of medicine could give.* If inflammation be an increase of vital powers, we should value our bleeding, our blistering, and our

* "All that art can do is to weaken life."—Van Swieten's 'Commentary on Boerhaave,' vol. i, § 106.

evacuants in accordance with the degree in which they reduce the strength. If, on the other hand, the phenomena of inflammation indicate direct deficiency of vitality, not only in the general system, but in the part affected, then we must make the chief end to be kept in view in our treatment the retention and increase of vitality. And when we employ the means I have named, we must look upon their debilitating action as an ugly fault unfortunately joined to some other virtue which they possess, and must try to counteract the evil while we retain the good.

Take for example the remedy bloodletting. Experience shows it to be beneficial in certain cases, so let us use it by all means. But all its benefits can be rationally traced to its mechanical hydrostatic action—to the taking away of so much fluid pressure which the weakened part is unable to bear. Let us, then, so apply the remedy that these mechanical phenomena should have most play, by making it as local and as sudden as we can, and by using it with a reference to what we want it to do. And all its evils can be also rationally traced to its physiological action—to its detraction of so much material of tissue from the circulation. Let us, then, when we use it for its mechanical advantage, counteract its physiological disadvantages by replacing to the best of our ability these materials of tissue. Instead of designedly starving our patients when we bleed, let us feed them.

We may reckon in the same way with other remedies less directly destructive than bloodletting. We should value them, not in proportion to their special evacuant power, for which they severally are classified as purgatives, expectorants, sudorifics, &c., but in proportion to the renewed growth of healthy tissue which accompanies their action. For example, epsom salts and aloes are both purgatives; but take a case of anæmic intestinal costiveness, and we know well that the more epsom salts the patient is dosed with the worse she is, but that aloes will restore a healthy condition to the mucous membrane of the bowels, and gradually reinstate its powers. It is not in proportion to their purgative powers that purgatives are beneficial, and we can hardly therefore consider that it is because of these purgative powers that they are beneficial.

The action of cantharides upon the skin as a curative agent

has been established by the common consent of many generations. Is it the blistering and destruction and drain of organic matter set up by the epispastic which does the good, or is some other part of its action? Now in eczema and herpes, and in smallpox above all, we have an enormous amount of blistering and destruction of skin and drain of organic matter; but instead of distant inflammation being arrested by them, or distant generation of pus prevented, we often see it produced. In smallpox, the more pustules there are on the body the more likely the patient is to have bronchial catarrh and pneumonia. Burns bear a still closer resemblance to the morbid process set on foot by cantharides; but the greater the extent of burn the more risk there is of internal inflammation. Then remark the stage of their action when blisters do good: their benefits are experienced, not when the destruction of epidermis is at its height, not when there is most serum and mucus and pus evacuated, but as the healing begins. Observe, for instance, a case of water in the chest under treatment: the level of the pleuritic fluid does not decline most rapidly when the blister on the surface is filled with serum, but when it is drying up and healing. Is it not, then, the growth of new cuticle which restores our patient?

In reckoning the beneficial actions of blisters as evidence for the counter-irritant theory of therapeutics, we are apt to forget the cantharidin which is absorbed by the skin, and the direct action of which absorbed drug on the mucous membranes is to bring them to a more healthy state. It appears, when taken by the mouth, for instance in chronic bronchitis, and sometimes in gonorrhæa, to be a direct stimulant of their vitality. Blisters may be beneficial in this way quite independent of their more eye-striking effect.

Perhaps the most powerful for good of all the agents added to the Pharmacopœia of late years is oil. During the internal use of oil the pus-secreting membranes and tissues dry up and become healthy, and their heated, congested state is diminished. And the more readily assimilated is the form of oil, so much the more marked is this improvement; that is to say, the more we saturate the system with a basis of growth, with a material capable of being built up into new tissues, the less likely it is to throw off those tissues in a half-formed state.

The easy digestibility of cod-liver oil to my mind more than accounts for its wonderful effects, and makes superfluous the chemist's aims to find iodine or any other drug as a constant constituent in it. The good we do by administering it is in direct proportion to the largeness of the supply of nutriment thus presented to the tissues, and bears no relation to any pathogenetic results.

In investigating the action of drugs, we are sometimes apt to look too far, and in our search for the mysterious to pass over the obvious. We are apt to bestow too little thought on the immediate action of these agents on the mucous membranes with which they come in contact. Quinine, for example, inasmuch as it passes through the blood so far as to reappear in the urine, doubtless influences most tissues of the body; but still nine patients out of ten receive the greater part of the benefit accruing from the use of quinine by means of the augmented appetite and digestion which results from its presence on the mucous membrane of the stomach, not in the blood. It seems probable that the improvement in the vitality of pus-secreting parts which accompanies a course of quinine is due to the greater quantity of nutriment which this useful drug causes the mucous tract of the intestines to absorb.

The influence of heat upon mucus is a suggestive fact. If allowed to get cold, the globules cease to develop the little life they have; but if kept at the temperature of the body, they continue to grow into pus in spite of the unnatural circumstances in which they are placed under the microscope. This seems to explain how hot fermentations and poultices "favour suppuration," as surgeons say, in boils and abscesses. It explains also why suppuration is usually more rapid in deeply-seated, well-covered parts than in exposed situations. But is it wise thus to "favour suppuration?" Yes, truly; for while we are aiding the vitality of the pus-forming material, we are also aiding the vitality of the surrounding tissue—we are enabling it to recover that perfect state in which it need no longer waste its nutriment by throwing it off in a semi-vitalised stage; while at the same time the pus formed is the most natural, the warmest, the softest, and the least injurious substance we can apply to a sore tissue.

The recognised benefit of moist warmth may, I think, suggest to us something more. When an animal submits to the periodical latency of the higher functions which takes place during sleep, it instinctively seeks the warmest birth it can find; it is instinctively careless about the supply of oxygen so that it can get heat. Beasts hide themselves in unventilated dens and burrows; man surrounds himself with blankets and curtains in a close bedroom, and not all the questionable arguments of busy philanthropists can persuade him to open his window at night. I suppose that instinct is hereditary experience transmitted by generation from sire to son, and continuously increased through countless ages. It is not surprising, therefore, that its silent voice should beat out of the field the voice of argument, however loquacious. But I doubt if we physicians listen for it carefully enough. In that state of deficient vitality which constitutes disease, we are sadly apt to leave to accident the duty of cherishing the weak life by warmth. In every hospital I enter, the wards are a great deal too cold. Because their forefathers tried to keep the sick warm by unwise methods, the public in the present day zealously oppose the better means of healthy warmth which new inventions provide. Can we be surprised at rheumatic patients falling into pericarditis, at fever patients having pneumonia, when house-visitors, vigorous and well fed, walk in from the park, and finding the wards smell of mutton-broth and poultices, order the windows open without compunction? Such things are; but they might be prevented if physicians would first convince themselves, and then the public, that an atmosphere and a temperature which is agreeable and wholesome to the healthy need not be either agreeable or wholesome to the sick.

I have endeavoured in these three lectures to point out the practical bearings of what is a limited though an important part of the phenomena of life. It is not indeed even the whole of that pathological state which we conveniently call inflammation. But I think no harm is done by pressing to results deductions from even the most limited observations, so long as we remember that they are limited, and so long as we do not forcibly bend other observations into coincidence with them.

LECTURE VI.

TYPH-FEVER.

Case—Cause of fever—Why it affects some and not all—The virus acts slowly, and enters probably by the alimentary canal—Case showing the progress of fever-poison checked by emetics—Action of fever-poison on living organism—Devitalising power on blood—The first symptom of partial death is a rigor—Next symptom, pain—Loss of appetite which does not arise from defective metamorphosis—diarrhœa, hæmorrhage, and increased heat, all are evidences that disease is something less than life—The object of treatment is not the mere typh poison, but the interstitial death of the tissues—The touch-stone of restorative medicine is its application—Use of emetics—Tepid sponging—Cold affusion removes but does not check the formation of heat—Supply of food—Hydrochloric acid—Alcohol—Local bloodletting—Principal difference between patients lies in the stomach—Two instances—Deduction.

(*Clinical, St. Mary's, October* 18*th*, 1861.)

You saw a case of continued low fever (or as I shall call it for shortness Typh-fever) admitted four days ago, which presents a good many points valuable for instruction.

Charles P., aged 15, a shop-messenger, who has grown rapidly lately, and has been worked perhaps rather beyond his strength, stated on admission that he had felt ill, languid, and unfit for exertion during the last six weeks. The past fortnight he had come home every evening without any appetite for his supper, and had sat cowering and shivering over the fire. For three days he vomited all food taken, had diarrhœa, and pain in the belly. Cough also had come on with a stitch in the right side during inspiration, and he had expectorated transparent mucus with sooty specks in it.

There were to be seen on the surface of the abdomen and chest upwards of a dozen dingy fever-spots in several stages, some entirely disappearing on pressure, some not. You found no pain or gurgling on pressure of the belly, and the diarrhœa was stated to have ceased. You saw the patient prostrate from great muscular langour and inability to stand, and a very weary, dull look in his eyes. His tongue was thickly coated with yellow fur; his skin was hot and dry; his pulse 104, small and sharp. His urine was high-coloured, and deposited a copious yellow sediment, soluble by heat. The quantity passed during the next twenty-four hours after admission was fifteen ounces, of the specific gravity 1·020. Then you noticed that the right cheek was flushed. The lower part of the right lung you heard was dull on percussion, and to the listening ear there were moist cracklings coarse and fine in it, and dry whistling sounds scattered about the rest of the lungs.

The boy's mother stated that they lived in a healthy attic, dry and free from foul odours, and could in no wise account for the illness.

Here is a sporadic case of one of the low continued fevers common in this metropolis, and which have received a great variety of names according to variations impressed upon them by the epidemic temporary constitution of the air or the peculiarities of the individual. The two best-marked and best-known varieties are called "typhus" and "typhoid," distinguished by peculiarities of eruption, and we hardly ever get a case in London which may not either be classed as one or the other, or be represented as a transition between the two. In registration at St. Mary's we make the distinction, and often also in speaking pathologically of the cases. But in treating them I do not do so; and therefore in lecturing about treatment, which is the business of a clinical teacher, I have adopted a name which would include both, from its likeness would be generally understood, would not involve adhesion to any theory of identity or difference, and have in addition the merit of shortness. When I speak of continued low zymotic fever I shall call it "typh-fever."

The present case has been a good one for study, for it has presented all the most important symptoms without the patient being so ill as to be unable to tell his story, or to make the

repetition of it and the examination by pupils dangerous to him. I will call your attention to what you may learn from it.

There is every reason to believe that one of the chief exciting causes of these fevers is a poison generated by decomposing organic matter and received into the body from without. To judge by its effects it seems to be widely diffused through the air, especially in the neighbourhood of its origin in the air of sewers, putrid marshes, and crowded human habitations. If you are readers of popular sanitary literature, you are probably crop-full of the accumulated and *decies repetita* evidence of this fact. You are tempted to ask how it is, if the poison is spread so broadcast, that everybody does not get poisoned? You will wonder why it should get into the body of this boy, whilst you, really much more exposed to it, escape. But remember there are two things necessary to poisoning; not only the poison, but a person apt to be poisoned. And, in point of fact, the latter is the most important element in the transaction. It is only on a predisposed body that a morbid poison acts. Most likely we are all constantly taking in minute doses of the poison which is the exciting cause of these continued fevers, and can digest, oxidize it, or otherwise render it harmless under ordinary circumstances. But should some epidemic influence or exceptional deficiency of vitality rob us of the power of doing so, then we suffer the effects and have typhus or typhoid fever, as the case may happen to be. There was reason enough for this boy being the victim, while others escaped, shown in his recent rapid growth and in his strength being overtasked by his work. The exhaustion of vitality allowed the poison to do its work.

Besides this purely foreign mode of generation of the poison, it would appear capable of being produced within the body itself—out of its own substance—idiopathically. At least such a closely similar train of phenomena follow, where an external origin would seem a forced interpretation of nature, that we can hardly help coming to the conclusion I have stated in the last sentence. Thus a typhous state follows severe and disorganizing wounds, where all noxious foreign influences have been cautiously shut out; and mere climatic agencies, such as the unwonted heat of the sun, overwork, chills, damps, and especially a combination of these circumstances, will bring on the

well-known "febricula," perhaps of only a few days' duration, perhaps protracted into or (as some word it) "changing into" a regular typhus.

I speak of the exciting cause of fever as of a material ponderable substance for the sake of convenience. But I do not wish to exclude the possibility of its being an immaterial power or force, like light, heat, electricity, or sound, are held to be. If it is so, it is like them associated with ponderable matter, and becomes known to us only by means of such association. We speak of a thunder-cloud causing certain phenomena, although we know it is the electricity of the cloud which does so; of the sun burning us when we mean the heat of the sun; of a cannon deafening us when we refer to the vibrations of the air acting on our ears. And so we may speak of the poisoning power as a part of that modification of matter to which it is joined, in spite of that modification of matter possibly existing in a similar form (chemically speaking) without being joined to it.

Observe how slowly the power acts in some cases. Our patient is upwards of five weeks ailing before any of the distinctive features of his fever show themselves, and then they creep out one by one. The time is not usually so long, especially during epidemics, but you may detect it in the history of almost every case. And you ought to notice it, because from some systematic works you might be led to thinking that a continued fever was easily to be measured by days and hours from the very moment of invasion. This is impossible in practice, and would be of little use were it possible.

I rather incline to think that the most usual path by which the virus enters is the digestive canal, in cases where it is begotten of decomposing organic matters foreign to the body. It is probably mixed with the saliva and carried down to the stomach, where it possibly may increase and multiply in the gastric mucus. During severe epidemics it has been observed that those who smoke or chew, especially if they spit out the saliva instead of swallowing it, are less liable to be attacked.* And at an early

* Mr. Catlin, of American-Indian celebrity, attributes the comparative freedom of his wild friends from malarious influences to their being taught as infants to sleep with their mouths shut, and to their being prevented by etiquette in after life from ever opening them, except for eating or speaking.

stage, even after the virus has begun to act upon the system, the fever may be stayed by emptying the stomach, and thus preventing the whole dose being taken up. Those who have watched my practice will have witnessed several instances of the success of this treatment; they will have seen the fever cut short, and convalescence entered upon immediately, with its characteristics of painless weakness and emaciation gradually passing away.

One case last autumn gives me the opportunity of putting on record that the influence of the remedy is not merely apparent or accidental, but that it really removes an essential part of the disease. W. S., a robust lad aged 15, came into the hospital September 5th, 1860, with hot skin, rigors, excessive muscular languor, pain in the back, limbs, and head of four days' duration, gurgling in the right iliac fossa, and rose spots. For the first twenty-four hours he had no medicine, and the urine was kept and analysed. The result exhibited the following quantities of its various constituents daily excreted:—

Date.	Quantity in cubic centimètres.	Specific gravity.	Grammes. Urea.	Uric Acid.	Chloride of Sodium.	Sulphuric Acid.	Phosphoric Acid.
Sept. 6, 1860.....	1000	1·027	50·63	·43	·25	3·48	3·24

Then an emetic was administered, and coincident with a universal remission of all the symptoms, the urine exhibited the following remarkable change in the amount passed during the next five periods of twenty-four hours:—

Date.	Quantity in cubic centimètres.	Specific gravity.	Grammes. Urea.	Uric Acid.	Chloride of Sodium.	Sulphuric Acid.	Phosphoric Acid.
Sept. 7	530	1·028	29·37	a trace	0·79	1·97	1·14
Sept. 8 and 9; mean of two days' urine mixed	770	1 016	14·79	0·037	2·68	1·008	0·72
Sept. 10.....	1200	1·011	18·42	0·090	4·20	1·34	0·32
Sept. 11..	1320	1·006	16·71	a trace	4·62	0·96	0·71

Now, the contrast between these specimens of urine is exactly that which is found between the urine during typh-fever and the urine during convalescence. In the first there is evidence of destructive metamorphosis going on with extreme rapidity; in the latter the destruction is overtopped by renewal. And this change into convalescence was most strikingly marked as due to the operation of the emetic. When we see so often the immediate consequence of one dose of so simple a remedy, it is difficult to avoid the conclusion that its benefit is purely mechanical, and that it acts by removing from the mucous membrane of the stomach a poison only partially absorbed and still adherent to it. Another reason for guessing that the gastric mucous membrane is an early if not the earliest recipient, is that it early exhibits such special phenomena as usually accompany the ingestion of an unwholesome material. Spontaneous vomiting is very generally found in the first stage of the attack (as you have observed in the patient under consideration), and seems to offer a presumption that the part which is then most feeling the effects of the poison is that organ which most resents it—the gastric mucous membrane. Such is the evidence by which I have been led to believe that the exciting cause of typh-fever enters usually by the digestive canal—*valeat quantum.*

When the poison has once gained admission and is diffused by means of the circulation through the system, its effect is to destroy the vitality of a considerable amount of the organic living matter with which it comes in contact. The destruction is interstitial, not local—I mean, it does not kill wholly a certain spot which it touches, like sulphuric acid, but it kills only certain constituents of the tissues. The destruction is also partial, not entire—the organic matter is by no means utterly disorganized, but only brought down to a less vital, less organic condition. It may be traced easiest in the changes found in the medium by which it is diffused. The blood, the common thoroughfare for distribution of good and evil to the tissues, is seriously changed. If you examine it under the microscope you will find that the normally-shaped red discs are diminished in numbers as compared with what pathologists call "melanosed" corpuscles, that is to say, dying or dead discs, shrivelled and small, of a dark colour, with black specks in them, and with

gimped edges. In bad cases these are unable to range themselves in rolls, as healthy blood does when it coagulates; they seem to have scarce any attraction for one another and lie in amorphous heaps. They dissolve easily in the serum and form with it a red fluid. You may trace this dissolution in the dusky stain which the blood communicates to the skin in typh-fever.

The poisoning apparently goes on very gradually in some cases, and quicker in others. You heard from this boy that he was five weeks ailing before he gave up work. There was an imperfect renewal of the body, shown by languor after exertion and by loss of appetite or deficient demand for new material. But destructive assimilation was not checked, there was no impediment to the carrying off of the effete tissues by excretion. It may be that in a great many cases the disease, the partial death, stops here, the destroyed tissues and their destroyer together are disorganized, are reduced to their elements and pass away. The idea is incapable of proof, but it would account for a vast number of those mysterious languors, unclassified, unnamed, and often unpitied, which distress patients and puzzle doctors.

It is a characteristic of this sort of virus to poison mainly the nervous system. The fevers it produces get their name from thence—τῦφος = a smoke or mist over-clouding the instrument of connection between body and mind. In no other diseases of equal curability is it so much affected. When therefore the poisoning has reached a certain pitch, and that not a very high pitch, early in the disease, the nervous system takes notice thereof, and expresses itself in its most common mode of taking notice of partial death, namely, by a shivering fit. Any severe injury to the body, a stretching of fibrous tissues, an operation, the fear of an operation, the absorption of destructive drugs, such as antimony for example, will cause more or less of a rigor in proportion to the sensitiveness of the individual. And thus also in zymotic fevers, when the interstitial death of the neural constituents of the body arrives at a certain degree, there follows a rigor. This rigor recurs from time to time at uncertain intervals, but generally about once a day, and most commonly in the evening, as the mother remarked in the case which forms the text of my lecture.

Then commences another symptom of partial death—pain. This boy described his head, his limbs, and his back as aching all at once. That is to say, wherever there was most tissue with sensitive nerves in it, there was found pain, indicating the diseased state of that tissue. Now this aching is a symptom of the earlier, rather than of the more advanced stages of typh-fever; not because there is in the latter less death, but because then the nervous system becomes partially dead too, and does not feel so acutely; while in the former it retains most of its normal sensibility.

Observe that our patient tells us of nausea and loss of appetite, which diminished the food eaten—of vomiting, which rejected the greater part of that diminished food—and of diarrhœa, which carried off the remainder scarce digested at all. Yet in spite of all, the amount of solid matter passed from the kidneys is fair; the specific gravity of the fifteen ounces of urine passed in the twenty-four hours is 1·020, which is a good deal for a person not in strong health. The metamorphosis, therefore, of the worn-out tissues into urea and salts is active; there is a continuous destruction of them in spite of the defective supply. This goes on so long as the poison lasts in the body; but when it is got rid of, the destruction ceases; no more of the tissue is metamorphosed than is required to make room for new material, and the specific gravity of the urine falls during convalescence. This may take place very suddenly, as in the instance I gave you of a fever cut short by an emetic; but in general the alteration is more gradual.

I have mentioned the large amount of urea in proportion to the nutrition contained in the urine of typh-fever, which is rendered evident by its high specific gravity. There is also an increase very evident to the naked eye in another constituent of some importance, the coloured organic material, which gives the secretion its ordinary hue. You saw how dark this boy's water was, and how deeply it stained the vessel from which I poured it or a piece of white linen. We have great reason to think that there is a close alliance between this substance and whatever it is which gives the red tint to the blood-discs, and that its excess depends on excessive destruction of those important little living particles.

The sulphuric and phosphoric acids combined with bases, which form a necessary part of urine, do not in fevers follow the lead of the urea; their amount is less than in health. Whether this is due to the destructive metamorphosis taking less effect on the chief tissues containing sulphur and phosphorus, than it does on the blood and muscles, is doubtful. Dr. Parkes suggests that perhaps a third of the normal sulphates and phosphates of the urine are derived directly from the food, and not from the metamorphosis of tissue; and therefore that their diminution in typh-fever may be owing to the starvation, while the amount which still remains represents a fair proportion of destruction.*

The chlorine, in the shape of chloride of sodium, is also in small quantity, but not so deficient as to lead us to suppose that the metamorphosis of the chlorinated materials of the body does not go on, or that there is retention of them in the fluids. The great quantity of chloride of sodium taken as food, and directly mixing with all the fluids, again brings in difficulty. And another is thrown in our way by the frequency of intercurrent pneumonia, which itself causes a retention of the chlorides naturally excreted from the kidneys. This youth, for example, has a little pneumonia, and we could not, therefore, say if absence of chlorides in his case were due to that inflammation or to typh-fever. In other cases our impediments to knowledge are diarrhœa or colliquative sweating, which carry off chloride of sodium.

The diarrhœa so frequent a companion of continued fever is a further evidence of death in the blood. Let the fluid fever stools be set aside in a tall glass, and you will see them shortly separate into two parts; the higher one a half-transparent serum, in which float epithelial scales and crystals of ammonio-magnesian phosphate; the lower stratum a greenish-black flocculent precipitate. This last has no smell of bile, nor is bile to be found in it by chemical tests; but it contains broken-up blood-discs and a great quantity of dark, granular colouring matter—it is just like blood altered by the secretions of the bowels. And very often when you let the stools separate in this way, and look at them by transmitted light, you will see a visible sanguineous tinge in them, and blood mixed with mucus

* Parkes 'On the Urine,' B. ii, part iii, sect. 4.

is visibly passed from the bowels. Blood, too, is not unfrequently spat up with the mucus from the lungs, and drips from the nose ; and in bad cases the dried-up mucous membrane of the mouth cracks, and exudes the sanguineous serum on the surface of the tongue, producing the "dry, brown tongue" characteristic of severe fever. All these prominent symptoms call your attention to the interstitial death, the lessened life of the body.

The increased heat in fever is to the careless observer rather adverse to the doctrine which I have advanced, that all disease is an evidence of diminished vitality. And in truth it requires some thought to see why it is not a conclusive objection. But an answer to the idea of an augmentation of heat being necessarily an augmentation of life is afforded by the fact of many recorded instances of the increase of corporeal warmth having taken place in corpses actually after full death ; so that, discarding at once the notion of its being a proof of vitality, we may try and trace what causes, really rather to be associated with death, may give rise to it in the cases under our eye. In the first place, in fever you have a diminution of the evaporation which takes place from a healthy skin, and which acts as a powerful refrigerator, as any physiologist who has perspired knows full well. The dormant dry skin does not do its cooling office. Then in the second place, there is a much larger quantity of dead matter to be evacuated, and the destructive metamorphosis of this dead matter, the semi-vital chemical destruction, raises the temperature, as all chemical solutions do. Wherever metamorphosis is rapid, the temperature is raised. But this metamorphosis alone, this passage of living into inorganic matter, cannot be called an increase of life, inasmuch as it indicates an advance of death. It is necessary, may be, to the removal from the body of poisoned ingredients, and is so far an advantage, but still it is an indication of the quantity that is poisoned.

Such are some of the most prominent consequences of the typh poison in the human body.

You may call to mind, very likely, warnings I have given you against the old humoral pathologist's doctrine of a materies morbi, which was looked upon as the disease, and which he thought he has done his duty by endeavouring to eliminate.

"Surely," you will say, "this which you have been describing is a most typical materies morbi; if I evacuate this, I cure the disease." Not so fast—the bullet which enters the soldier's ribs is a materies morbi,—have you cured the disease when you have extracted it? Nay, more—suppose the bullet passed right through the chest and went out on the other side, would you consider the disease gone? No, the typh poison is not the disease, any more than a bullet, or sulphuric acid, or opium is a disease, though each may be a material cause of disease. The partial death which these agents cause is the disease—is that which requires to be treated, and must be the chief point for the physician's consideration.

Here let us bring our doctrines to their touchstone—bedside application. The physician should ask himself, What vitality is wanting, and where? And, How shall I easiest supply it?

In the first place, if he sees the case early, almost the only thing he notices is the lowered vitality of the stomach—how badly it digests its food, and how it loathes its usual work. He conjectures that its function is arrested by the presence of some poison, and he empties it with an emetic. In many cases brought under treatment early in the disease, this cuts it short at once, as I told you in a former part of the lecture, and as you have occasional opportunities of observing in the wards.

Secondly, supposing he is too late for his *coup de main,* he remarks that the skin is hot and dry, in a great measure from deficient perspiration and evaporation on the surface of the body. He undertakes to supply this want by an artificial moisture. He sponges the whole person over three or four times a day with tepid water, to which the nurses here generally add some distilled vinegar to make it more agreeable. The relief given is most sensible and immediate; but of course it soon passes away, as changes of temperature are in their very nature temporary. It must therefore be frequently repeated.

Cold affusion is sometimes spoken of, both by opponents and advocates, as "checking" or "arresting" the febrile heat. This is apt to give you a wrong notion. If it really arrested the metamorphosis which is the cause of that heat, it would be obnoxious to all that could be said against it. But in fact it no more "arrests" or "checks" the heat than emptying the bladder

"arrests" the secretion of urine. A few moments' thought will show you that what it does is to remove the heat from the external surface; and if it affects the cause of heat at all, it would rather encourage it by making room for more.

If the attendants have sufficient leisure to attend to an operation which consumes a good deal of time, it adds very much to the comfort derived from the sponging to anoint the body with some softly scented olive oil. This supplies the place of the arrested sebaceous follicles, and softens the skin for the absorption and exhalation of water. It is a mistake to suppose that oil and water are at all inconsistent or incapable of mixing in the substance of living tissues.

Where there is pneumonia in fever, or where the patient has recently had acute rheumatism, I confess I am somewhat cautious about the employment of aqueous affusion. It sometimes chills the chest and causes an attack of pleurisy on the inflamed side, or pericarditis. Besides which, in the case of pneumonia, it interferes with a plan I have of keeping a large poultice outside the affected part, and which I find so beneficial that I do not like to omit it. For this reason sponging was not ordered for the present patient.

Thirdly, the physician sees that a large supply of nitrogenous material must be wanting. The nitrogenous tissues are devitalized, are running away in a disproportionate excretion of urea and other organic compounds, and nothing is taking their place. Shall he act antagonistically, and give some drug whose tendency is to stop the passage of urea by the kidneys? I do not know exactly how he would set about it; but I do know that if he succeeded, he would do positive harm; for the very worst cases of fever are those in which metamorphosis is active (as shown by the heat), while the excretion of urea is arrested (as shown by the lightness of the urine); they resemble cases of uræmic poisoning from diseased kidneys. The other principles of treatment which I noticed in my introductory lecture of this session* would not perhaps be so directly injurious, but common sense would still allot the palm to restoration here. Let it be your chief aim to supply that which you clearly see is passing away —nitrogenous tissue.

* Referring to Lecture I of the former edition.

But how will you supply it? Solid food would in all probability be vomited, from the unbearable loathing it excites. If not vomited, it would lie for some time a mere foreign matter outside the mucous membrane of the digestive canal, and then pass away by diarrhœa, with much flatus and fetor and much disengagement of gas during putrefaction. Your beef-steak might as well have been originally thrown down its final destination, the water-closet; to which it passes putrid though undigested. Neither is it wise to fill the stomach with large quantities of victuals, for the same result follows. No "meals" must, therefore, be allowed; and prudence suggests the giving in their place very small doses of nitrogenous aliment very frequently. These pass over the irritated stomach unconsciously, and are taken up gradually by the intestines, requiring but very little to make them fit for absorption. The suitablest food is that which is naturally supplied to the weakest stomach. The feeble digestive organs of babies can assimilate milk, and milk forms the most appropriate nourishment for the debilitated viscera of the fever patient. By giving two or three ounces every hour you may get down a quart and a half per diem. But in ordinary instances every two hours is often enough, and that period is adopted for the boy before us. If there is sufficient acid left in the stomach to coagulate the casein into clots, and cheesy lumps are rejected by vomiting, as happens sometimes in milder cases, you may guard against this by adding liquor calcis or soda-water to the milk, or you may supply its place by beef-tea. But it is the lumping of the cheese into solid masses that it is desirable to avoid, not the acidification, which is beneficial. If the patient takes thus a good supply of milk and beef-tea, not only is the imminent danger of death by starvation avoided, but the emaciation which follows during convalescence is much less extreme, and the dangers in its wake less formidable.

Eggs are a highly nutritious food; if taken raw, and diluted with milk or water, they are quickly absorbed. But should they be delayed and putrefy, the products of their decomposition are peculiarly injurious: the sulphuretted hydrogen and ammonia evolved are poisons to the intestines. I should recommend you to avoid eggs till convalescence has restored the gastric powers. The same objection does not lie against milk, the lactic acid

arising from whose decomposition assists in the solution of the casein. Sour buttermilk is by no means to be despised as a food.

Fourthly, the physician should turn his attention to the pharmacopœia, and consider what he can cull from thence which will be of service.

You have been taught in the systematic course on medical pathology, that ammonia, which is always being formed and given off from the animal body, is found much more abundant in certain conditions than in others, and that these conditions are those in which nutritive metamorphosis or growth was deficient as compared with destructive metamorphosis, or those in which there is retention in the blood of the products of that destructive metamorphosis. Thus, more ammonia is found in the breath after toil than after rest; more than usual in those who hurt their digestion by smoking tobacco; a great deal in uræmia, where the urea cannot escape by the kidneys; but above all in typh-fever is this exhalation of decay noticeable, as you will find in Dr. Richardson's valuable work on the coagulation of the blood,* where the phrase "super-alkalinity of the blood" is applied to this condition. Dr. Richardson goes so far as to attribute to this super-alkalinity the special typhoid symptoms, and to suggest that the absorption of ammonia in excess may intensify fever in those who contract it from exposure to decaying organic matter, or human exhalations. He supports his hypothesis on the experiment of inducing the symptoms, or something resembling them, by the injection of ammonia into the veins of an animal. The word "super-alkalinity" is expressive, and quite unobjectionable, so long as it is understood that the superabundance is not absolute, but comparative. For it is not shown that there is more alkali in the body than there ought to be, but more than there is acid to neutralize. "Sub-acidity" would be a synonymous term, and would be more suggestive of the means we have at our disposal for remedying the defect.

Very difficult indeed would it be for the eliminator to get this alkali out, but it is easy for the restoratist to get acid in.

* Richardson on the 'Cause of the coagulation of the blood,' Appendix I. (Edit. 1858.)

The acid I have always given is hydrochloric, and you consequently see on this lad's card—"℞. *Acidi hydrochlorici diluti* ♏*xx. syrupi* ℥j., *aquæ* ℥j. *alternâ quâque horâ sumat.*"

Rich patients like a little more sugar, but I have not found them approve of the syrup of mulberries and barley water in which more elegant vehicle the late Dr. Maton used to give muriatic acid in fever. They say this is mawkish, and prefer the cheaper form, even on the score of taste. But it is still more approved of for its beneficial effects. This boy said to-day of his own accord, he hoped I should continue the draughts, they made him "feel so much stronger," meaning to express a sensation of relief to the wearisome languor of fever. In mild cases the tongue begins to clean immediately, the thirst and diarrhœa much abate, and the repugnance to food is diminished.

In a clinical lecture at this hospital in January, 1858,* I gave the details of the first dozen cases treated on this plan, and as you are a different audience from that which heard me at that time, perhaps I may be allowed to repeat the sentences in which I then tried to interpret the beneficial consequences:—"What blood, when analysed, comes nearest in its altered proportions to the blood in low fever? Is it not that of scurvy and purpura? There is the same excess of blackened (melanosed) blood-discs, the same deficiency of neutral salts and organizable (coagulable) lymph. Everybody treats these chronic affections with acids, and why not also an acute affection which corresponds with them in one point at any rate? As to the particular acid employed, muriatic certainly deserves to be tried before others—first, because it is such a large constituent of the body that it might almost be called a food instead of a medicine; and secondly, because it is such a powerful arrester of the decomposition of animal matters. Pour it into a sewer, and you destroy the miasma. May it not in the body stop that miasma from poisoning the tissues?"

The allusion in the last sentence is to chlorine as a disinfectant. But I now doubt if there is sufficient evidence of the benefit derived from the hydrochloric acid being due to this property. About sixteen years ago, I employed chlorine water

* Printed in the 'Lancet,' January 30 and February 6, 1858, and partly reprinted in the next lecture but one.

as a medicine in fever at the Chelsea Dispensary; yet I was not encouraged to carry on the treatment by tracing any benefit to it. Whether the chlorine which can be introduced in this way is not sufficient in amount (for it must be very dilute, or else it will induce choking), or whether it is really useless, I do not know; but the inconvenience caused me to leave off its employment.

Dr. Pereira in his "Materia medica" speaks slightingly of the use of hydrochloric acid in putrid fevers, and implies that it rests solely on exploded theoretical propositions. He should have noticed that Boerhaave and Van Swieten recommend it, and that Sydenham used sulphuric acid in these forms of disease as an antiseptic drug. And these were men not easily led into erroneous practice by a prevalent theory. To their experience I can add my testimony, for I have employed the plan above described in every case of typh-fever since the summer of 1857, and have had yearly more and more reason to speak well of it.*

Dr. Pereira, in afterwards speaking of its use in dyspepsia, gives as a reason for its employment therein, that first, "it is a constituent of the healthy gastric juice; and, secondly, when mixed with mucus, it has a solvent or digestive power in the case of various articles of diet." Is not this as much a reason for giving it in acute cases as in chronic?

Whether, then, as Sydenham seems to have thought, any other acid would do as well as the hydrochloric, I cannot say, but it forms so large a constituent of the body combined with alkali in the blood and tissues, and free in the solvent juices, that it appears peculiarly suited to the purpose on restorative principles.

As to the use of alcohol in fevers, I am guided almost entirely by the condition of the nervous system If there is very complete prostration and delirium of a low muttering character, it is required. A tremulous state of the muscles, marked especially by a quivering of the hands and fingers, is a good test of the necessity for it; and so is the sharp, weak, unequal beat of the heart. All these indicate that the nervous system is feeling very sensitively the destructive metamorphosis going on,

* This yearly growing experience is put into numbers in a subsequent lecture.

and has its power lowered by its sensitiveness. Then is the opportunity for the powerful anæsthetic alcohol, which in severe cases you see me order without scruple, but which I do not rank as part of the necessary methodus medendi of fever, and have not yet ordered for the lad we have been prescribing for. Above all, I would caution you against employing it as a substitute for the treatment which I have been describing. Wine may be useful as an adjunct, but never must it take the place of the true restoratives.

There is, though, another of the exceptional methods of treatment, which has been employed with utility in this case—the local abstraction of blood. The boy had congestive pneumonia of the lower part of one lung, and I did not hesitate to cup him beneath the scapula on that side. And not unfrequently when there is pain in the right iliac fossa, with diarrhœa and tenesmus, I put leeches on the belly at the seat of pain. You watched the dulness on percussion rapidly pass away from the lower lobe in our patient here; and you will often see an equal relief to the abdominal congestion by the same agency.

But you will cry out that I am sadly inconsistent. I am feeding up the patient with one hand and taking his pabulum vitæ with another. The reproach is just in a certain sense, but that a very limited one; and, in fact, may be levelled against half the operations of daily life. We are constantly suffering a small loss for the sake of greater gain. And I think the loss of a little blood is practically of no moment at all compared with the advantage of securing a freer circulation through the lungs or a diminution of congestion in the intestinal canal. Do not be led away by the superficial notion that blood is blood, and blood is life. That is not true, for blood varies immensely in its composition, some being very valuable, and some worthless. To lose a portion of the half-dead circulating fluid of fever is but little loss, and that little loss is amply repaid by the additional nutriment which a small bloodletting will enable to be absorbed. The deficiency is soon made up again under a restorative system of treatment.

In the sequelæ of low fevers, more than in any other diseases, the great difference between one patient and another as respects

their power of recovery, lies in their stomach. There is a girl of four years old now in Victoria Ward, who was admitted on the 2nd of September for rose-spotted fever, which had come out during the concluding week of August. She passed through the fever pretty favourably, but for the last seven weeks has had a succession of most formidable abscesses in the back, the cervical glands, the internal ears, and the parotid glands; yet, in spite of the exhausting effect of the large discharge of pus from these spots, she has continued advancing in convalescence, she has gained flesh and muscular power, so that now she can sit up. For this happy result she has to thank a most wonderful appetite, which never seems satisfied, even with an amount of food which is large for an adult, and which she delights to wash down with wine and porter. No tonics seem of so much use to her as an extra snack at physic time.

The most striking recovery from these pyæmic abscesses after fever you witnessed last year in a girl of sixteen (E. A., admitted September 28, 1860). She had very putrid fever, accompanied by hæmoptysis, epistaxis, and bloody discharge per vaginam. She got well of her fever by the help of hydrochloric acid and wine. But as she became convalescent in the third week of October, she began to have large boils in the head; these were followed by abscesses running on into sloughing sores on the back. During the first week in November inflammation and swelling of the left leg began. This quickly passed into purulent infiltration of the whole of the left thigh, an opening in which on November 28 discharged two pints of pus in twenty-four hours, and smaller quantities daily for several successive weeks. On December 12, there was a large abscess in the axilla, which was lanced and discharged several ounces. Her state of debility was such that she could not in the least help to feed herself. Yet all this time her stomach was in a state that a glutton would look up to as a seventh heaven. She was literally always hungry. As she swallowed her last bit of beef-steak she would feebly ask when she was to have some more, and what would be her next meal; and the way her eager eyes followed any article of food that passed her bed was quite affecting. We allowed her wolfish appetite its full liberty, and fed the puny maid like a gigantic gladiator. The end of the

tale is, that she recovered from an amount of purulent disease which it would have seemed impossible for the human frame to bear—and recovered perfectly, for I saw her in the April of the next year, looking as healthy and walking as briskly as if she had never been ill.

The moral of these cases is to do all you can to increase the appetite, and strengthen the digestive powers. Reckon the value of this drug and that drug, one tonic and another tonic, solely by the effect they have on the desire for food. If any remedy lessen this desire, insist upon leaving it off, whatever authorities may have recommended it; and form your judgment, not from tradition or prescription, but from its effect in the particular case before you.

LECTURE VII.*

TYPH-FEVER.

Therapeutical Statistics.

(*Clinical, St. Mary's, October* 17, 1863.)

I HAVE often spoken with confidence of the advantage of the treatment you see me pursue in fever, and I am going to-day to lay before you the reasons why this confidence has been growing yearly stronger and stronger.

Since the opening of the hospital in the summer of 1851, to the time of my leaving London for the vacation last August, there have been registered as under my care 230 examples of continued fever. Of these, 109 have been treated on what may be termed "general principles;" that is to say, they took neutral salines three or four times a-day, with small doses once or twice a-day of hydrargyrum cum cretà at first, and later in the disease, bark, ammonia, ether, and wine, when these remedies seemed required by the symptoms. Leeches and cupping were employed to the exterior of inflamed viscera as occasion called, and food was administered at the ordinary four daily meal-times. The other 121 have been treated on an uniform plan of continuous nutrition; animal food, in a liquid form, has been given every two hours, day and night, while the patients were awake, and between every dose of nutriment a dose of hydrochloric acid. They have been sponged two or three times daily with tepid water, when the skin was hot and dry; and, in a few instances, leeches or cupping have been used to the exterior of inflamed localities in the abdomen or chest.

* The substance of this lecture was brought before the Medico-Chirurgical Society in April, but a few additional cases have altered the figures a little.

These two classes of patients offer a fair basis for a statistical comparison of the therapeutical agencies brought into play: it is fair for the following reasons:

1. In the first place, each series is very nearly continuous; all the first-named 109 (with five purely accidental exceptions,*) occurred in the six years before September, 1857, and all the latter 121 in the six years since. No fallacy can, therefore, arise from a selection for special treatment having been made intentionally or unintentionally.

2. They are spread over a considerable number of years; thus both sets include sporadic cases, as well as the produce of epidemics.

3. They were all treated by the same physician in the same wards of a general hospital (where the cases are usually more severe than in special fever hospitals), and they nearly all come from the same group of districts of which our hospital is the centre.

4. The diagnoses have been made and the records kept by registrars who have nothing to do with the treatment, and are independent of the physician in attendance.

The only opening for error that I can discern is the bare possibility of a change of type in fevers having taken place at the very time when I changed the treatment, and of its having lasted for six years—possibilities which the records of other metropolitan hospitals during the same period reduce to nothing.

That the severity of the disease in the two classes differed but little may be shown by the near equality of the periods of convalescence. The mean time of stay in the hospital of the sick who recovered was, in the first series, 29·2 days; in the second, 26·7 days; being a difference of but 2½ days. The ages, also, of the two series differed but little, the mean age of each being between 22 and 23 years.

These averages are cited merely to show the general similarity of the two series, and not to demonstrate any pathological fact.

* Three of these exceptions were treated on general principles by a colleague taking my duty during my absence, and unaware of the experiment I was trying; in one case I made a wrong diagnosis, having mistaken typh-fever for acute hydrocephalus, and treated it with iodide of potassium till too late; of the fifth I have no record, the patient having died within two days, and the clerk's notes being imperfect, except as to the fact of its being a case of fever.

Of the first series (viz., those treated on general principles),

9	are entered as	Typhus, and of these there died		4
44	„	Typhoïd „ „		16
56	„	Of doubtful or unrecorded type	„	3
Total 109			Total	23

Of the second series:

25	are entered as	Typhus, and of these there died		0
52	„	Typhoïd „ „		2
44	„	Of doubtful or unrecorded type	„	2
Total 121				4

For purposes of comparison in a therapeutical inquiry, it will probably be considered right to exclude from the first table two deaths, and from the second table one death, which occurred within two days of admission; for the exhaustion caused by the journey to the hospital in severe fevers allows but little scope for judging of the action of treatment during that period. This leaves the average mortality under general treatment 21 in 107 $=19\frac{1}{2}$ per cent., or nearly 1 in 5;* under the second method of treatment, by continuous nutriment and hydrochloric acid, 3 in $121=2\frac{1}{2}$ per cent., or only 1 in 40.

I cannot, therefore, avoid the conclusion that the means employed in the cases on the second list are very efficient in preserving life; and that out of every 100 persons attacked by continued fever, from 16 to 17 more may be saved thus than by treating them on general principles.

The continuous liquid nutriment given every two hours consisted of strong beef-tea and milk, of which together about six pints were administered in the twenty-four hours. The hydrochloric acid was given every two hours in doses of twenty minims of the Pharmacopœal dilute acid in water or eau sucrée. Both food and drugs were seen by the nurses to be swallowed, and not left to the discretion of patients, who, from nausea and occasional delirium, cannot be trusted to help themselves.

The most immediate result of the hydrochloric acid is the more natural condition of the digestive mucous membrane, as

* This mortality is higher than is usual at special fever hospitals, being about the same as at the other general hospitals in London.

shown at its two extremities, by the cleaning of the tongue at the one end and the cessation of diarrhœa at the other. The more natural condition of the mucous membrane enables the greatest possible quantity of nutriment to be absorbed to take the place of the tissues poisoned and interstitially destroyed by the virus which is the cause of the fever. That the acid in any chemical way neutralizes, counteracts, or evacuates the virus is, I think, unlikely. For the mean period of convalescence in these cases was shortened by only $2\frac{1}{2}$ days; and certainly it would have been shortened more than that were the virus removed or rendered inert. That the convalescence is not more shortened, cannot of course be judged of in individual cases, and I state the fact from the statistics of the average stay of the patients in hospital, which I before quoted.

Whether the hydrochloric acid would be equally useful in all climates, I cannot say; but in Shanghai, a climate as different as possible from England, Dr. Henderson* states that its employment diminished the mortality of continued fever from 28 per cent. to 7 per cent., a very marked decrease.

The action of wine and of emetics in continued fevers is not attempted to be tested in this inquiry. In both classes of cases they were given; the wine, as usual, in accordance with the patient's age and the condition of the nervous system, and emetics whenever the history we could elicit made us conjecture that the fever was in its first week. My impression is that a vomit, when given within the first four days, materially lessened the severity of the fever; and in some instances, seemed to cut it short. But I do not know how to obtain numerical evidence on the subject. I have never found an emetic do harm, unless there were antimony in it, when it sometimes caused or increased diarrhœa, and failed of the intended purpose. For this reason I prefer plain ipecacuanha.

* 'Medical Times,' March 21st, 1863.

LECTURE VIII.

TYPH-FEVER.

Cases with running commentary—Relapse of rose-spots—Contagion from patients to a nurse—Leeches and mercury—Mulberry-rash—Intermittent pulse—Rose-spots or mulberry-spots, which most dangerous?—Wine in fevers—Retarded emaciation—Subcuticular eruption—Contagion—Artificial cuticle in bed-sores—Sudamina—Low condition in convalescence, its symptoms.

[It may be remarked that the date attached to the ensuing matter is earlier by more than five years than that which precedes it here. The cases are taken from the latter half of a clinical lecture published in the 'Lancet' of February 6th, 1858, where, after nine others in which general treatment was employed, are detailed the particulars of the first twelve instances of the use of the method described a few pages back. It was not therefore necessary again to allude to these patients, nor to the fact of their having passed favourably through the attack. But some of them illustrating points of pathological interest, and some of them, besides the common treatment of the disease, having required that which was specially suited to each case, they are here reproduced.]

(*Clinical, St. Mary's, January 20th,* 1858.)

* * * * *

Case 10.—William W. (Case Book 103, p. 52). This was the deputy coachman from the infected house I spoke of in Case 8. He had equal muscular prostration but not nearly so much mental affection as the housemaid. On the skin there were rosy spots, coming out slowly and in consecutive crops. One peculiarity in this case is, that during convalescence, when walking about and eating meat, he had a relapse, and the rosy spots came out again, with delirium, prostration, &c., nearly as bad as at first. It is very rare to have a relapse of rosy petechiæ, but you see it is not impossible.

Case 11.—Mary Ann B. (C. B. 103, p. 64), a nurse in the hospital, had mild delirious fever without any eruption. I am afraid we must allow that she caught it from the patients, for certainly there is no bad drainage here to generate it. There occurs one case now and then, to show you that low fever is contagious, and but one to show you that it is very slightly so.

Case 12.—Fanny A. (C. B. 103, p. 66). This girl complained a good deal of pain in the right iliac fossa several times recurring, which at last was treated by leeches and mercury with immediate relief. You may often hesitate about these remedies, for fear of lowering the patient's strength by depletion; but if the pain is made a subject of complaint, you may feel safe; for the very fact of the sensitiveness of the body shows that it is not too low to bear them. Those who are so much prostrated as to make a few leeches dangerous, are insensible to slight pain, and do not complain unless pressed.

Case 13.—Emma B. (C. B. 103, p. 82). I never saw a skin more thickly covered with a mulberry-rash than in this fine stout brunette of eighteen; yet few have recovered so quickly. She came in on October 5th, having been ill eight days, with a pulse of 120 and great prostration; on the 6th, her pulse was "80, and intermittent;" on the 7th, "70, and intermittent;" on the 8th, "natural;" after which medicines were left off, as she was convalescent. I am inclined to think that the natural tendency to develope colouring matter exhibited in the skin of dark persons causes them also to develope more freely than others the coloured eruptions.

You will read in many old books (and sound books too) statements to the effect that dark livid spots in fevers are an evidence of more danger than rosy spots, and that the danger is greatest when this dark rash is most abundant. You will have ample opportunities during your student life of seeing that neither of these rules is applicable to facts as they come before you. There are most deaths amongst the rose-spotted, and you will see many cases of unusually rapid recovery amongst those with a very copious eruption. Yet for all that I believe the ancients reported right. I believe that the difference is made by our more rational mode of treating our patients—successful in both sorts of cases, but most especially in those where the

livid rash shows the chief force of the poison to have fallen on the blood. Without wine, the most fatal cases would be amongst the livid-spotted; with wine, the most are amongst the rosy.*

Emaciation did not commence in this patient till she was so far convalescent as to be up and dressed, and then with great rapidity she lost flesh. From the way in which she withstood and passed through the disease at its height, you would not have supposed her to have been so severely ill as she really was. But the quick destruction of all the tissues, and their necessary renewal before the full functions of life can be performed, show how profoundly the typhous poison affects them. Emaciation may be rather called part of the cure than part of the disease; it is nature's mode of getting rid of injured tissue.

Case 14.—William W. (C. B. 103, p. 112). Pink spots; abdominal pain relieved by leeches; quite *en régle*.

Case 15.—Edward P. (C. B. 103, p. 114). This robust man was again one of a set where the fever was traceable to a poisonous locality. You may remember that he made so much noise by yelling "Dust-ho!" that he was obliged to be removed to the noisy ward. He turned out to be a workman at a neighbouring dust-contractor's, and the foreman of the yard was brought in a few days afterwards, in Dr. Alderson's week; and a third dustman came from close by, and will appear as Case 19. All these were very muscular men and very noisy. The first and second had rosy raised spots, which were peculiarly distinct and characteristic in Dr. Alderson's patient; but the third had a livid rash; and in the first, who is at present under review, there were livid mixed with rose spots.

Remark the nature of this man's occupation. Typhous miasmata are perhaps generated more rapidly when the substances whence they arise are wet, because moisture aids de-

* Let me not be supposed to say that the use of wine in fever is a modern discovery. All good authorities of all ages allow it in exceptional cases; but till the present generation modes of diagnosis have not been accurate enough to separate entirely idiopathic fever and acute inflammations; and therefore an adherence to Galen's condemnation of wine was really prudent in them as a rule.

composition. But when once they are produced, there is much greater danger of their diffusion in poisonous amount from dry matters. Workers in sewers sometimes get poisoned by sulphuretted hydrogen, but they do not catch fever; nor do the men who cart night-soil into the country for manure. But when this is spread out on the fields, and exposed to the sun and air, it often causes a limited epidemic. So too, when drains are dried up by the summer heat, the disease is more rife than in seasons when they are full. A dried marsh, and the banks of tidal rivers exposed at low water, are made more pestiferous. So you see sanitary improvements require judgment as well as zeal. I believe the safest mode of treating dust would be to wet it.

You will observe that hearty people, when they do get low fever, generally have it very badly, as was the case here. I suppose their system is able to resist small doses of the poison, and when it absorbs large doses they are the more completely prostrated. Be careful not to give a favourable prognosis because your patient is a strong man: the muscular and the corpulent are of all the population those who run most risk.

Case 16.—Caroline H. (C. B. 103, p. 214). This woman had great pain on pressing the abdomen, and fever stools. So she ought, by rule, to have exhibited a rosy rash; but, instead of that, there was a dusky subcuticular eruption, which is generally held to be of the mulberry sort. Van Swieten describes it as "lying very deep under the skin, as if nature, overpowered by the violence of the disease, could not complete the critical translation which she had begun."* He considers it a dangerous sign, and I think he is right, as a general rule; for, though this woman recovered, she was very ill.

Case 17.—Charles N. (C. B. 103, p. 228). This boy, again, had livid spots accompanying abdominal complications, which were relieved by leeches.

Case 18.—Mary D. (C. B. 103, p. 228). A washerwoman, who became affected immediately after receiving the dirty linen from a house where there had been fever patients. It seems to me difficult to avoid a conclusion, that low fever may become

* 'Commentaries on Boerhaave,' vol. vi, sect. 723.

contagious when the poison is concentrated. It is certainly wise to act upon this opinion.

Here again I made you remark the intermittence of the pulse from debility during fever; and I also called your attention to the natural appearance of the stools during the height of the disease, and to their becoming liquid and fetid as the febrile symptoms declined and she began to emaciate. A diarrhœa of such a sort at such a time is a very favourable occurrence; it is a critical discharge of the peccant humours.

Case 19.—John G. (C. B. 103, p. 232). This was the third dustman. His pulse was also intermittent, as in the three former cases, but not till he was getting better. At first it was not above 80, though he was very noisily delirious, and had a brown tongue. You may observe this abnormal slowness of fever pulses to be particularly prevalent in certain seasons. They have been slower than is quite consistent with the severity of other symptoms this winter.

Case 20.—Stephen F. (C. B. 103, p. 246). I hear from Mr. Sanders, of Chigwell, who attends this boy's family, that they had fever with "mulberry-rash" in the house, and that a brother had died of it. Stephen was sent to London to be out of the way, but sickened on the day of his arrival, and had rose spots in several crops. It is difficult to imagine the probability of two brothers contracting different miasmatic diseases in the same house, at the same time, and from the same cause; and the rational conclusion would seem to be, that both were of the same nature. It could only be the most overwhelming evidence which should lead us to think otherwise.

Stephen was near following his brother to the grave. The more propitious hygienic circumstances under which he was placed, in an airy hospital, instead of an ill-drained cottage, weighted the scale in his favour. I do not see anything fresh to remark in the pathology of this case, except that the patient got a superficial sore on the back by obstinately saturating his sheets with urine and fæces, and continuously rubbing the sacrum against them. You must distinguish these superficial sores from sloughs, because the same treatment will not prevent them. They will be produced by friction in spite of a water-

pillow and all possible cleanliness, as in this lad's case. The best way of managing them is to paint the parts directly they get red with gutta percha softened in chloroform, of the consistence of paint, so as to dry immediately on application. You thus obtain an artificial new cuticle, and can renew it as many times a day as you like.

Case 21.—Henry G. (C. B. 103, p. 292). Instead of coloured petechiæ, the eruption in this very low case consisted of miliary vesicles scattered like fine seeds all over the chest and abdomen. They are called in the case-book "sudamina." The word is derived from their often accompanying excessive perspiration;* but remark that the association is not a necessary one; this man's skin was quite dry till he became convalescent.

Case 22.†—John B. (C. B. 103, p. 106). I have taken him out of chronological order, because he was not treated by muriatic acid. In fact, the fever had passed away, and he might be called convalescent; yet you saw him very ill, unable to raise himself in bed, and with a brown crust in the centre of his tongue. On inquiry I found that this low condition, remaining after the special symptoms of the fever had passed away, arose from inanition. Beef-tea, wine, and bark, set him up directly. You will see a good many such cases in dispensary practice; they die, though convalescent, from sheer starvation. It is of some importance to recognise this fact, and you will find the most pathognomonic sign is the coincidence of the brown tongue with a perfectly clear mind and cool skin. These latter show that the typh poison has passed away, and that the condition of the mouth is the result of want of nutriment.

* Or perhaps from their likeness to beads of sweat scattered over the skin.

† The numbers refer to the cases as they stood in the lecture originally published in the 'Lancet' newspaper.

LECTURE IX.

TYPH-FEVER.

PART I.—*Three fatal cases since October,* 1861—*One brought in moribund, one treated with hydrochloric acid, &c., one not —Four cases in hospital related, with comments—Danger of giving solid food too early in convalescence—Absence of enteric symptoms best guide to administration of solids— Dose of hydrochloric acid for children—Connexion of typh-fever and pneumonia—Smallpox caught during convalescence from typh-fever.*

PART II.—*Additional case, illustrative of the connexion between the two forms of typh-fever eruptions—Precautions in case of threatened pneumonia—Caution against moving patients in fevers.*

PART III.—*Four additional cases, with comments.* CASE 1.— *Difficulty of distinguishing typhus and enteric fever—Relief of enteric pain—Dry, glazed, cracked tongue in enteric cases —Arrest of diarrhœa by hydrochloric acid, by Dover's powder, &c.* CASE 2.—*Fever spots and flea-bites—Fever cut short by an emetic—Emaciation during convalescence not prevented by the cutting short of the fever.* CASE 3.— *Fever cut short by an emetic—When not arrestive, this treatment is palliative.* CASE 4.—*Fever contracted in the hospital aggravated nearly to a fatal extent by inflammation of previously diseased genital organs and bladder, and by a slough on the sacrum.—Treatment.*

PART IV.—*Case of typh-fever contracted in the hospital by a patient admitted for acute rheumatism—Emetic only partially successful.—Administration of solid food and wine.*

(*Clinical, St. Mary's, January* 10*th,* 1863.)

SINCE October, 1861, when I last discoursed to you on continued fever, it has been more than usually prevalent in both

its enteric and typhus forms, especially in the latter form during the present session. I have persisted in the employment of the same treatment I then commended to your notice, and with the same encouragement to proceed.

There have been two deaths among those so treated. One was in the case of a little boy, age unknown, who was carried into the ward December 17th, 1861, quite unconscious, cold, pulseless, with livid lips and colliquative diarrhœa. I scarcely can tell how much of the nourishment given him was swallowed, and he did not survive the morrow of his entering the hospital.

I should have liked to know in what state this child was before he was brought away from home. It is not at all impossible that he might then have been in a condition admitting of recovery; for children very rarely die of typh-fever, however severely they may have it. At all events, it is certain that the exhaustion of the journey hither was the immediate cause of the fatal result. The patient was, to all practical purposes of restoration, dead before he came inside the doors.

If your future pursuits should place under your charge poor people at their own houses, I do hope that events such as these (and they are sadly common), will make an impression upon you. Pray do not send bad cases of typh-fever out of their beds to be dragged in an exhausted state to a hospital. None of the advantages to obtained there can compensate for the chances of life so thrown away.

Another death occurred in a girl of eighteen. I was away for my holiday at the time of her decease, and no post-mortem examination of the body was permitted by the friends; nor are the clerk's notes very explicit—they seldom are in vacation time—but as far as I can judge from the history given me by the ward-sister, she seems to have yielded to a very rapidly congestive pneumonia. I am very sorry to have no further information about her, as nothing is so instructive as the investigation of the causes of failure of treatment usually successful.

Another case of death from the inflamed and ulcerated bowels which so often accompany typh-fever, occurred in November last. But she was unfortunately not treated in my usual way,

for a reason which I will take the opportunity of telling you as a warning, as I trust the same reason is likely to be rare. The patient, Elizabeth T—, was a girl of eleven years old, who was brought here October 24th, with intense headache, deafness, delirium, vomiting, picking at the nose, and other symptoms, which the mother attributed to a blow on the back of the head. This led to a wrong diagnosis, and the child was, by my orders, treated with iodide of potassium, and blisters on the vertex, as for inflammation of the brain (*hydrocephalus acutus*). I was absent from London at the time of her death also, but a post-mortem examination was made. The brain was congested and wet, as it usually is in those that succumb to acute fevers, and have blood more fluid than natural. There was however nothing like the appearances caused by acute hydrocephalus, nor any trace of injury. On opening the abdomen, the cause of death was at once referred to the ilia, which were extensively inflamed and ulcerated in the manner usual in typh-fever.

I wish people would more frequently put on record mistakes made in diagnosis; they are full of interest and instruction for themselves and others.

The rest of the fever patients which have passed through the wards have done well, and I have no record of anything noteworthy in their cases, beyond circumstances to which I have called your attention in former lectures *apropos* of former instances. I do not lecture to you about by-gone patients, except they have presented phenomena unlikely to occur again, preferring to wait patiently till I can illustrate my words from the life.

I will confine my remarks, then, to the four cases now remaining under your eyes, two in the male, and two in the female wards.

Elizabeth T—, aged twenty-two, was made my patient December 9th, 1862, with rose-spotted fever of five days' duration since the introductory rigor, with very thickly coated tongue, diarrhœa, and severe pain on pressure of the abdomen. Everything went on well, no fresh spots came out after the 13th. On the 18th the appetite returned, and she was allowed fish diet at her urgent request, although some tenderness remained in the

abdomen, and on the 20th meat and beer. On the 25th it seems her appetite had failed again, and she had a rigor and some vomiting. When I saw her on the 26th she was unable to stand; her whole aspect denoted a relapse, and I sent her to bed with a return to my usual treatment of fever, dietetic and medicinal. It was a short attack, and no spots were seen on the skin. So that on January the 7th, she was convalescent, and is now eating solid meat.

The remark I have to make on this case is to warn you against too early yielding to the request of patients for solid food. They have a fallacious notion that it is more nutritious than the continuous liquid diet which is given them, and in order to get it will pretend to feel more appetite than they really do feel. They will also often conceal that tenderness of the abdomen which is the sign of the yet unhealed congestion of the mucous membrane of the ilia. I should tell you, too, that when the patient takes hydrochloric acid, you are more frequently tempted to the error in judgment against which I am warning you than when they have other medicines. The acid causes a more rapid renewal of the lingual, and I suppose, at the same time, of the intestinal, epithelium: the dead, dirty coat is cleared away, and you have a clean tongue earlier than would otherwise happen. I was talked over by the patient too easily in this case, and ought to have been deterred, by the abdominal tenderness, from giving her meat so soon. The consequence was, the slight relapse which you have witnessed.

William W—, a dirty, dissipated looking person of thirty-six years old, was sent to bed on the 28th ult., in a state of weakness and constant delirium, which entirely prevented his giving any account of himself; and now that he is getting well, his memory of recent events seems very dim. He was said however to have been ill a week, his body was covered with livid spots, his tongue was brown and dry, and his tremulous hands kept picking at fancied objects before his eyes and on the bedclothes. There was no diarrhœa or pain in the abdomen.

He was treated in the usual way, and had ten ounces of port wine daily, with the usual result.

It is noted in the diary that he had some evacuation of liquid motions soon after admission, but that the stool was "natural"

in appearance. What is meant is that it was such as is naturally caused by a purgative drug, not the dark fetid excretion of fever, and in fact was traceable to an emetic draught which was administered on admission, and which did not cause vomiting and therefore went off by the bowels. Be careful to distinguish phenomena arising in the course of disease which are caused by art from those which are morbid and part of its essence.

This man had no real diarrhœa and no pain on pressure of the abdomen, and therefore I did not hesitate on January 7th to order him meat diet on his expressing himself desirous of it, although he was not sufficiently recovered of his fever to be able to raise himself in bed; and I feel confident he will continue, as heretofore, to do justice to his treatment.

Edward C—, a boy of seven years old, was seized on December 28th with rigors, nausea, loss of appetite, nocturnal delirium, and febrile depression, so that he could not lift up his head. He was brought under my care on December 31st, by which time there were numerous dusky fever spots on the belly. He was put upon the usual treatment, and is now convalescent. I have to remark about the orders on the medicine card, that he took the same quantity of hydrochloric acid which is administered to adults, namely, twenty minims every two hours, without any inconvenience following. I have not generally given such large doses to children, but shall know now that it may be done with propriety.

It is remarkable that a few days before this boy was attacked by typh-fever, without any local complication whatever, his father fell ill and was brought into the hospital on December 29th, with pneumonia affecting between one third and half of the left lung. The father has had no delirium, nor more nervous depression than is accounted for by the condensation of the lung, no eruption on the skin, nor diarrhœa, nor anything which would lead one to set down his complaint as due to the same cause as his son's. Yet the coincidence, joined to the fact of their residence being in an ill-drained, ill-ventilated house, where almost every one has been ill, is too striking to be passed over in silence. Did the exposure to cold and wet during his daily labour predispose the hard-worked father's lung to be affected

by the same cause, the typh-poison, as absorbed into the boy's blood acted principally on the nervous system? Was his more robust frame, and the *dura messorum ilia* able to pass unscathed a dose of the typh sufficient to poison the more delicate tissues of the younger subject, while at the same time his lung, devitalized by wearing toil and exposure, yielded to its influence? Is, in short, the pneumonia the expression of a quantity of poison enough to injure a failing part but not enough to affect his whole body? I do not like to answer these questions *ex cathedrâ*, but I cannot help seeing some connection between typh-fever and inflammation of the lung.

The different way in which the same morbid agent affects different individuals should guard you against considering it as the disease, against looking upon illness as something to be evacuated or neutralized. *The* disease, that against which you have to struggle, is the partial deficiency of life caused by this morbid agent, and your struggles must take different forms according to the different forms of the deficiency.

The fourth case of typh-fever still in the hospital is that of Sarah H—. She is a married woman, aged twenty-eight, of slim figure, and not muscularly strong. She was admitted December 5th, having rose-spotted fever of three days' duration since the rigor, and accompanied by delirium. As is usually the case with delicately-framed susceptible females, the nervous system was especially affected: we were forced, in addition to the usual fever treatment, to give her a great deal of port wine; the belly became tympanitic, and I was at one time seriously alarmed about her. However on December 18th she was in her right mind and convalescent, though unable to raise herself from the lying posture for her natural evacuations.

I mention the fact of her being quite confined to bed for a special reason. On the last-named date there was in the ward for a few hours, a patient who was discovered to have variola, and was sent off to the Smallpox Hospital. Now, Sarah H— was the only unvaccinated person in the ward, and the consequence was that she received the infection, and has since gone through a severe attack of the confluent form of smallpox. In spite, however, of having thus imbibed a new poison, she continued to increase in health and strength till the 30th. On the

morning of the 31st she had a decided rigor, she became feverish, lost her appetite, and had nausea. The pulse rose to 110. Thinking she was about to have a relapse, like the first patient to whom I drew your attention, I put her back on the usual fever treatment, which she has continued to have ever since.

One piece of information you may gain from the accident of this unfortunate patient having the two diseases so close upon one another, is the fact that typh-fever does not prevent a person receiving the infection of smallpox. A second is, that the presence, in a latent state, of the morbid poison which gives rise to the latter disease, does not retard the progress of convalescence from the former; and is in reality dormant as well as latent. A third is, that on the whole, the sufferings from smallpox are more severe than those from typh-fever. Our patient declared, at first, that the fever was the worst of the two, but by the time the pustules had completely maturated, and she was sore all over, she frankly confessed to me her error.

(*Clinical, St. Mary's, February* 13*th*, 1863.)

On Ellen D—, a servant girl aged sixteen, who came under your observation three days ago with typh-fever of a week's duration, you have seen an instance of the two most common forms of eruption in this disease. The bosom and abdomen were thickly covered with dark livid spots, many of them as deep purple as those of purpura hæmorrhagica. She was in a very low state, the blood being very venous. Yesterday, in addition to the purple spots, I observed on the abdomen several spots slightly raised above the surface of the skin, and of a much more pinkish hue. Her hair, and probably, therefore, her skin are naturally dark, so the maculæ are not so pink as they would be in a blonde complexion; but still, no one would hesitate to call them "typhoid" spots. This shows you the great difficulty that lies in the question of whether there are two distinct animal poisons causing "typhoid" and "typhus" fever. Doubtless, it is not impossible that both may exist in the body at the same time, and give rise to two distinct fevers at the same time; just

as a person might be poisoned by a mixture of strychnine and antimony, and exhibit the effects of both drugs together. But in the case of morbid poisons which increase in the body, such a joint progress shows at least a very close relation between the two. There are also other instances where the eruption seems to exhibit a transitional character, or where there is not a sufficiently distinctive eruption. In our register these cases are not distinguished, but are entered simply as "fever." If then there are two poisons which cause typh-fever, a point I consider not proved, they must be much nearer allied to one another than those which originate the usual eruptive fevers, such as scarlatina, smallpox, &c.

You may have observed that I am loose in my nomenclature of this class of diseases, speaking sometimes of "common continued fever," sometimes of "continued fever," sometimes of "low fever," sometimes of "typh-fever," sometimes of "fever" simply, when I mean the same thing. This is not from carelessness, but to show you my opinion that for therapeutics, to which the greater part of my clinical lectures refer, the name is unimportant; and also because the terms "typhoid" and "typhus," having acquired a special limited meaning, and when used by me, being used in that special limited meaning, are unsuited to my general purpose. Their employment would seem to prejudge a question upon which I am not engaged in this chair.

I should advise you also not dogmatically to prejudge the question. Use, if you like, the popular nomenclature, but do not be sceptical of the possibility of the eruptions being phenomena of one morbid poison, varied by varying circumstances, any more than you are sceptical about their being indications of two poisons.

There is no necessity for being in a hurry to decide, for it is not a matter of any importance to yourself or your patient. Both forms of disease are infectious to a certain extent, as occasional instances in the wards show you. Typhus is said to be most so, perhaps from its following a larger dose of the poison; but neither are very infectious, and do not require the extraordinary precautions proper for smallpox, measles, or scarlatina. And both call for the same treatment, and are

accompanied, though in varying proportions, by the same local inflammations.

While on the subject of typh eruptions, I may take the opportunity of warning you not to limit your observations solely to the surface of the chest or abdomen, as is very commonly done. The flanks and buttocks are often the seat of them, and I have sometimes found spots very marked and indubitable in these situations, when their presence elsewhere was doubtful. In females especially it is convenient to find them here, as it obviates the necessity for baring the front of the person, a proceeding naturally repugnant to a delicate mind.

In this girl there was great general congestion of the lungs; the respirations were much hurried, amounting to thirty in the minute; there were sibilant râles all over the chest, most intense at the back part; but there was no localised dulness on percussion. In consequence, I believe, of this congestion, the pulse was quicker than usual, 140 in the minute; for you will rarely find it above 120 when the pulmonary tissue is in a healthy state.

When there is such an amount of congestion as to produce marked dyspnœa, it is better to omit the usual sponging of the surface of the body, or you run the risk of pneumonia. This had been done in the present instance, and the chest has been enveloped in a "jacket poultice." She now breathes easier, has less cough, and the pulse has sunk to 110, getting stronger at the same time. The continuous and even temperature of a poultice is by far the best means of restoring the deficient vitality of the lungs, where that deficient vitality is general, instead of being localised in one spot, as it is in circumscribed pneumonia.

You may observe that almost all non-delirious patients with typh-fever say on the first visit, that they are worse than before they left home to come into the hospital. Sometimes even deaths occur within the first thirty-six hours, of which I related you an instance in a former lecture,* the patients being, in fact, death-struck from the moment of admission. This arises from the exhaustion induced by the journey hither, of which you may always see traces, however short it may be. Removal even from

* January 10th. See page 100.

the next street does harm, and the harm increases in a mathematical ratio to the time and distance required. Bringing patients in from a great way is most murderous; no excellence of nursing or superior comforts can atone for the risk run. As far as we possibly can, we limit our reception of typh-fever to the neighbouring parishes, and prevent persons from a distance being admitted, if we hear beforehand of their coming. And once within the walls, they are spared every unnecessary movement; they are sent upstairs to bed in the lift, not allowed to raise their heads from the pillow to drink, and are supplied with a bed-pan for the other calls of nature.

In typh-fever everything depends on sparing most avariciously the little vital force that remains. You will have reason to regret every muscular exertion that you allow patients to make. I was called lately to Hertford to see what seemed to have been, and to be, a very moderate case of fever with intestinal affection. None of the distinctive bad symptoms peculiar to the disease had showed themselves. But unfortunately the patient had been at Brighton when taken ill; she pined for home, was allowed to move thither, and never rose from the prostration caused by the journey. I have heard of cases where the permission to sit up in a chair, instead of lying in bed, has resulted in fatal prostration.

You will find of course more obstinacy on this point among the upper classes than the lower, and you will sometimes have great difficulty in overcoming it. But it is your duty to try and do so; and should patients persist in disobeying orders to keep quiet, I advise you rather to cease your attendance than to give way. You must not allow people to sacrifice your good fame as well as their own lives.

(*Clinical, St. Mary's, March 6th,* 1863.)

Eliza C—, a stout muscular girl of eighteen, was received February 27th, with the usual symptoms of continued fever. The eruption was at first of a doubtful character; nobody could have decided accurately whether the spots were a pale example of those usually called typhus, or whether they were fading

typhoid spots. This difficulty is one of the many which beset the investigation of the question of their identity or non-identity. Inasmuch however as from the same house her sister was at the time under my care, and an aunt had just died with indubitable typhus, I thought it very likely her eruption would exhibit the same variety of appearance. But no—it proved not so, for since then many rosy spots, slightly elevated above the surface of the skin, have come out in successive crops. I mention this, because these rosy spots are a warning to the physician that he may expect inflammation of the intestines. And the warning has been justified in this case; for the patient's principal complaint during the last few days has been pain in the abdomen, aggravated by pressure of the right iliac fossa, and much lightened by a linseed-meal poultice. There is nothing does patients with enteric symptoms so much harm as moving about and the impression of dry cold, and nothing does them so much good as lying quite still on the back and applying moist warmth. A poultice accomplishes both objects, it keeps the patient immovable, and acts as a sort of perpetual warm-bath to the abdomen. It entails of course abstinence from the sponging treatment.

Another warning of enteric inflammation was seen in her dry tongue, without much coating of epithelium, and with transverse cracks from side to side. It is seldom that you see a tongue like this without the intestines being inflamed.

This girl has had scarcely any diarrhœa. The fact is, that the hydrochloric acid treatment always prevents the diarrhœa of fever from attaining any prominence as a symptom. There is usually just about enough to show what it would be if not stayed. Should the hydrochloric acid alone be not sufficient, the diarrhœa is best treated by Dover's powder, both the opium and the ipecacuanha in that preparation being good for dysenteric inflammation. Kino powder is also applicable to such cases; but chalk is of course out of the question while you are administering hydrochloric acid.

Thomas W—, a robust boy of sixteen, was brought here February 28th, with symptoms of low continued fever of three days duration. There was very great depression when the

resident medical officer, Dr. Rhodes, saw him then, and he fully expected it was going to be a very bad case. He ordered an emetic immediately, and the consequence was the vomiting of a quantity of blackish matter like semi-digested blood. When I saw the lad the next day, he was so brisk-looking in the face, and exhibited so little febrile depression, that at first sight I was disposed to question Dr. Rhodes' diagnosis. But then I was shown the abdomen and chest covered with small purple spots. Even then I was not convinced, and put the spots to the test of examination by the microscope. I thought they might be flea-bites.

Now, fleas cannot leave their marks without a puncture, and in all flea-bites you may, with a lens of very moderate power, if not with the naked eye, detect this puncture as a very minute dark-crimson point. The spots stood this test, there was no puncture, and they were certainly purpuric typhus spots, which have since faded away. But how is it that he had and, indeed has had since, so little febrile depression? The fact is, this is one of those fortunate cases of a fever cut short by an emetic. He is now emaciating, and emaciating extensively, and convalescent.

In the last sentence I laid some stress on the word "emaciating." The emaciation is a phenomenon of great interest; it shows how large an amount of tissue is interstitially poisoned in typh-fever; how large an amount requires to be carried off by destructive metamorphosis during the renewal of life. In such cases as this, when the fever is cut short, it by no means follows that the emaciation should be cut short, and in point of fact it is not so. The removal of the destroyed tissue is a necessary part of the case.

Strokes of good fortune are sometimes equally gregarious with the proverbially "seldom single" misfortunes. Next bed to the boy lies a man whose fever has been in the same way cut short by an emetic. Thomas B—, aged nineteen, exhibited on the 3rd of March the usual symptoms of continued fever of three days duration. There have been all along but few spots, and those of obscure indeterminate character on the abdomen. But he had the aspect of being very ill, and his tongue was thickly coated with yellow fur, and showed a tendency to get dry. He

was treated in the same way as the last patient, with an emetic and hydrochloric acid, and has entered forthwith upon convalescence. It is now nearly two years since I have had a case of fever so decidedly cut short by an emetic; so do not expect it often; but nearly all have the violence of the disease alleviated by that remedy; so that it is never out of place during the first week of the fever.

Emily H—, aged twenty-six, married, was entered to the ward assigned to uterine diseases, for irritability of the bladder arising from antiversion of the womb, in middle of last month. On the 2nd instant she was taken with feverishness, loss of appetite, and pains in the head and back. She had a rigor that night; she was transferred to me yesterday, and then there were obscure livid spots on the abdomen, and pain on pressure. She has been put on the usual treatment, and it appears likely to prove a mild case of typhus fever. I only mention it here as having been apparently contracted in the hospital, which I am glad to say is not a common occurrence.

(*Clinical, St. Mary's, March 20th*, 1863.)

Emily H—, about whom I said a few words on the day after her coming under my care, has given us more anxiety than I had looked for. Her antiversion of the uterus had been treated by a pessary, and her delirious, semi-conscious state, caused by the fever, prevented her making this known to the nurse. The instrument was removed immediately that it was discovered, and was followed by an excessively fetid discharge from the vagina, which lasted some days. A vaginitis had, in fact, been produced by the pressure, easily enough borne by a healthy vagina, but acting destructively on that part when its vitality was lowered by general disease. I was fearful that the patient was going to have internal sloughing, but she has escaped by good fortune and the use of an injection of decoction of cinchona and chlorinated soda. She has escaped so far as her generative organs are concerned, but not altogether: the vaginitis and fever united entirely paralysed the sphincters of the bladder and of the rectum, and it was impossible to prevent the pillow on which

her sacrum lay from being soaked with the excretions. Her constant delirium also, at first, made her very unmanageable. We could not prevent the pressure on the sacrum as we did in the other part, and the consequence is that she has rather a deep slough formed there.

This woman afforded an example of how the mental qualities, as well as the corporeal, suffer degradation in illness. During her raving she was constantly attempting to practice masturbation, and was uncurbed by shame, so that the nurse was obliged to be constantly on the watch to withhold her. I have no reason to suppose her a generally vicious person, and in recovering her reason she has recovered her modesty and self-restraint. When the human mind loses some of the divine powers bestowed by its Creator, it becomes as the mind of a brute. Madness is not something added to it, but something taken away; those powers are taken away by virtue of which it is said to be made "in the image of God," and by virtue of which it resists degrading influences. The degrees or forms of madness are degrees of loss of free-will and self-control.

I am happy to say she has now become rational, and also regained control over her sphincters, so that she is on the road towards convalescence. But if any more accidents happen, I will bring the case before you again.

You saw that till the inflamed, or dying, portion of skin gave way and broke, I kept it carefully painted over with gutta-percha dissolved in chloroform; she has also had a water-pillow. The treatment was unsuccessful indeed in this instance, but still it is the best. After the skin was broken, a cinchona cataplasm was applied, which, by the bye, I may tell you how to prepare most economically. Do not make it entirely of bark, but sprinkle the powder thickly over a common bread or linseed poultice; you thus save an expensive drug, and also keep it moister. Now that the sloughy cellular tissue has separated and been cast off, I shall treat the sore by touching it alternately with nitrate of silver and applying tincture of benzoin, whenever the edges look livid and unhealthy.

These low inflammations in continued fever are almost always a reason for giving alcohol to sustain the nervous system. Emily H— had at first six ounces of port wine daily, but I was

soon obliged to increase her allowance to half a bottle, and she will probably continue that during a great part of her convalescence. There is danger in suddenly leaving off stimulants which have been begun in fever.

(*Clinical, St. Mary's, January 24th*, 1863.)

Elizabeth J—, aged nineteen, came in on January 16th, with rheumatic fever, affecting principally the feet, knees, and hands. There was one day considerable pain on pressure of the cardiac region, such as is caused by rheumatism of the intercostal muscles; but that was immediately relieved by the application of half a dozen leeches, and there were no symptoms or signs of the disease spreading to the heart or pericardium. The pains were quite gone on the 21st, and on Sunday, January 25th, she was up and dressed, though still on the low diet, which seems best to suit convalescents from acute rheumatism. On that day she was taken with rigors, sudden loss of appetite, severe pains in the head, in the back and limbs, and complete prostration of strength. When the house-surgeon saw her in the evening, the tongue was exceedingly clammy, and covered with a whity-brown coat, as if getting dry; she was delirious; the pulse was 120; and the skin hot, and of a dusky mottled colour. Now, these symptoms were certainly not caused by the alkaline treatment of the rheumatic fever, for she took the bicarbonate of potash only five days, was not prostrated by it, and had left it off for four days; but as there had been a constant succession of bad cases of typhus fever in the ward, and the patient had all the symptoms of that complaint, Dr. Rhodes wisely decided that she must have caught it; and he, wisely also, acted in a decided manner. He immediately gave her an emetic, and put her on continuous liquid animal diet and hydrochloric acid every two hours, with tepid sponging three times a day.

I have told you that emetics will sometimes extinguish a typh-fever by a kind of *coup-de-main*. But really the cases in which this fortunate result follows are so rare, that you might hesitate whether it was worth aiming at, if no other good was to be gained by such bold treatment. It did not follow to the patient now under consideration; she remained delirious, quietly talking

nonsense about various things; during the next day (Monday) and part of Tuesday, her tongue got dry, although cleared by the treatment, and the pulse kept quick. The prostration and tremor of hands were very great. It was impossible not to conclude that she was under the influence of a powerful poison. The cause of the disease was not removed, nor the disease extinguished.

Yet, though not extinguished, it was certainly shortened, for on Wednesday you saw her with her tongue clean and moist, the skin much cooler, and the pulse, though still 120, much firmer. Now, the normal duration of such a severe typh-fever, as she gave every promise of having to go through, is at least three weeks; and she would have had, in the course of nature, to be much worse before she was better. But here you see her in three days enter upon a convalescence which I do not doubt will be permanent; and I cannot help attributing this abbreviation of the malady to the emetic.

She was so much better on Wednesday, that I was asked if she should leave off the acid and be put upon the bark treatment of convalescence, and also whether she should have wine. I have never made the alteration of medicine so early in the disease as this; but I have occasionally been induced by the cleanness of the tongue to do so only a few days later. And I must say, I have usually seen reason to regret it. The too early administration of cinchona, as well as the too early administration of solid food, have appeared to me to have been the causes of relapse in several cases. It is better not to give cinchona at all, and to postpone solid food till the patient is quite strong again, than to give them imprudently soon, and so to run the risk of relapse.

As to wine, seeing that she is a young girl not habituated to alcohol, and has got over her delirium without it, I think it a superfluous expense.

LECTURE X.

SMALLPOX.

PART I.—*Case of smallpox watched from first infection—Sequence of phenomena—Memoria technica by which to remember them—Use of observing them—Action of oxygen on the general health of the patient and on the skin contrasted—Microscopical examination of the contents of the pocks, with practical deductions therefrom—Depth of injury to skin in smallpox—Reasons for cutting the hair.*

PART II.—*Spread of smallpox in the hospital from the above case—Example of the use of vaccination in modifying the disease—Action of vaccinia not homœopathic or counter-irritant, but preventive—Infectiousness of smallpox compared with other diseases—Different degrees of infectiousness demand different precautions.*

(*Clinical, St. Mary's, January* 16*th*, 1863.)

YOU have had an opportunity, such as rarely falls to the lot of medical students, of watching the whole progress of smallpox, from the first introduction of the poison into the body, in the case of a young woman about whom I lectured last week apropos of her previous attack of typh-fever.* On December 18th, Sarah H— was confined to her bed in Victoria Ward, when a person with a variolous eruption fully developed was brought in, the law excluding such cases having been violated by an oversight consequent on the occupation of the officials by a hospital election. This person remained about two hours in the ward, and was never nearer to Sarah H— than thirty-six feet. But

* See page 104.

an extra nurse, who was then engaged, may very likely have been in attendance on both, and have carried the infection in her clothes, not having been reserved, as she ought to have been, to the dangerous patient. That such a mode of transfer may have taken place is rendered probable by this nurse having communicated smallpox to her own child, with whom she slept, without taking it herself. The nurse, however, and all in the ward except Sarah H—, had been fully vaccinated; and it shows the powerful protection thus afforded, that all escaped personal harm except Sarah H—. On her, indeed, the operation had been attempted, but it had failed.

Here you have been enabled to fix the exact time when the poison was received, and to trace the history of the resulting disease, unmodified by any protective or disturbing causes. The pathology of smallpox, as we are taught it in books of systematic medicine, is derived from such examples as these, occurring in the olden time before it was neutralized by Jenner's immortal discovery. And it should give us confidence in our forefathers' powers of observation that cases of unmodified small-pox, then the rule, now happily the rare exception, are rightly described. You have seen a sequence of phenomena punctual to the due times laid down by them, and which I teach you in my systematic lectures on their authority. Twelve days did the seed lie dormant; then its presence was declared by a three days, a more properly two days and a half, fever (counting from the first rigor); then for two days it bore a crop of papules; after that, a vesicle growing gradually opaque for three days more, and then for two days encircled by a halo of rosy inflammation; the next night brought the evidence of the complete filling of most of the pustules, by the rupture of the little band of epidermis which had hitherto fastened their centres to the cutis. When the vesicles were two days old, the face swelled and there was considerable salivary secretion; and the distension of the pustule was accompanied by swelled extremities. Since then the eruption has been gradually drying up.

To assist my memory as a pupil, I put these facts into some doggrel Latin verses:

Bis sex celatur virus, tres febre notatur,
Fertque duos soles papulam, tres postea opaquam

Vesicam, roseumque duos perfectior orbem;
Vincla cutis medii dissolvit postera luna.
Bidua vultum inflat vesica, movetque salivam.
Pustula fert distenta manûmque pedumque tumorem.

Rough and bad as they are, they served my purpose. You may easily fix them in your minds by taking the trouble to make improvements in the versification, for which there is ample room. There is a real clinical use in such an exertion of school-boy knack.

This normal order of the phenomena of variola is important to remember, not merely because it is a matter of scientific interest, but that you may be able to satisfy yonrselves and your patients that all is going on right, and that the very disagreeable and painful appearances which they present are not signs of overhanging danger. I refer especially to the swelling of the face and hands occurring in proper succession, and which would be alarming if unexpected; whereas if you are enabled to forsee them, they are rather good omens than the contrary, and are a source of justifiable consolation.

The unvarying sequence of the symptoms in smallpox may also serve in doubtful cases as a means of diagnosis, not only from other eruptive fevers, but even from chronic diseases. I have known, for instance, a case of eruption in a baby at the breast, where it was impossible to decide, by the appearance, whether it was variolous or syphilitic, and where the counting of the days alone enabled a conclusion, afterwards proved correct, to be come to. I see you smile at the idea of two such different diseases as syphilis and smallpox being confounded. But your smile is one of imperfect knowledge. Syphilis, child of sin, shows its kinship to the father of lies by imposing upon us imitations of almost every innocent morbid state; and among the rest it will often, in the infant, assume the exact aspect of smallpox, with central depression, red halo, and other usual diagnostic marks. The reckoning of the days of latency and of the progress of the eruption will alone save you from falling into our forefathers' original error of confounding the "small" and the "great" pocks in babies.

You may have observed that this woman was placed in a large room by herself, with a blazing fire and two windows open

night and day. To this access of fresh air to the lungs a great part of her freedom from the unfavourable symptoms so often accompanying confluent smallpox is doubtless to be attributed. She has enjoyed her liquid food all along, and has several times prompted the addition of eggs, pudding, ale, &c., to her diet card, and I have no doubt will ask for solid meat as soon as the sore pustules in her throat will allow her to swallow it.

But though the copious access of oxygen to the lungs is so highly desirable, I question very much whether it is equally desirable to the skin. I am led to this doubt by the following observation. When the pocks were filled out, I opened a good many with a lancet, and examined under a microscope the contained matter. This was divisible into three classes:

1. That taken from pocks of small size and with slight inflammatory halo. It was of the consistency of thin lard, white and opaque. Microscopically examined, it was seen to consist entirely of epidermic scales, the majority of normal aspect, but some filled with granular matter hiding from view the usual nucleus.

2. That taken from distinct and non-confluent pocks, with a broad halo, but not the largest or most humid of their kind. Here the normal scales were few, the granular scales equalising them in number, but more numerous than either were pus-globules of various sizes and of irregular shapes, as if budding on several sides.

3. That taken from the worst of the distinct pocks and from the confluent parts. This consisted in several specimens entirely of equal sized pus-globules, with many dark specks and highly refractive fat-globules among them. There were hardly any epidermic scales visible.

Three grades of death in the skin are represented by these three classes. In the first, the growing epidermis is merely loosened and thrown off in a pasty state; in the second, the cells are destroyed at an earlier stage of their existence, and only partially acquire a right to be called scales at all; in the third, they are killed still earlier, and their constituents form new pus.

By the last condition certainly, and by the second possibly,

the cutis runs great danger of being permanently scarred. Any accidental rubbing or disturbance must risk the causing it to ulcerate, and thus to form a pitted cicatrix. It is therefore of great consequence to the future appearance of the patients, if not to their freedom from consecutive fever, that the pocks should be kept from assuming such a condition. Now, on looking over the person of this woman, I found it to be a rule that the grade of destruction bore a direct ratio to the exposure of the various parts to the air. The most favoured situations were the thighs, tongue, and abdomen, next the legs and back, and then the hands and forearm. The face was the most purulently affected of all. With regard to the back, I should observe that it maintained its comparative immunity from advanced inflammation in spite of the cuticle being much chafed and rubbed off in large patches by the movements of the patient. So it would seem that oxygen and evaporation, so beneficial to the healthy skin, are death to it when diseased, and that the best hope of preventing its destruction in smallpox is to defend it from these agents.

To assist, then, the restoration of the skin, in parts important to the appearance, I believe it to be a most reasonable practice to cover it over with a coating, as impermeable as can be, of collodion or solution of gutta percha.* This can be easily done on the nose, cheeks, forehead, and ears, without interference with motion, and the coating itself and the rest of the face may be thickly oiled. It is only the most staunch adherents of therapeusis by evacuation that could object to this practice. Another rather more antiquated plan is to puncture the vesicles directly they are fully formed. The same object is aimed at, namely, the prevention of ulceration in the skin, and it is usually attained. But this latter expedient is rather troublesome, as it runs a chance of being roughly and coarsely executed if left to a nurse.

The depth to which the cutis is injured by the more severely inflamed of the pocks is curiously exemplified in the case of a young woman readmitted to-day with valvular disease of the heart (Eliza M—. Folio 169, p. 20). Her face is seamed and

* Dr. Smart has found that a solution of caoutchouc applied in the same way is better; it is elastic, and does not crack and peel off, like gutta percha.

graven over with white cicatrices, the relics of a variola by which she was affected years ago. The cicatrices are made more than commonly conspicuous by the extreme venous congestion of the rest of the skin of the face dependent upon her cardiac lesion. This venous congestion was so livid (almost black), that I should have been very much alarmed about it, as significative of a dangerous disturbance of the circulation, had I not remembered her as an old patient, and been familiar with her scarred face. By experience I knew that a moderate amount of dyspnœa was accompanied in her case with extreme congestion of the capillaries of the dilapidated skin. This may serve as a lesson to you not to be too soon frightened at the venous blueness of the countenance in pock-marked patients.

You may have observed that the smallpoxed patient's hair has been cut short with scissors, leaving it about half an inch long all over. The object of this is partly cleanliness, for it is impossible to keep long hair from being saturated with the discharge from the pocks, and then it becomes most fetid. The scalp is so sore, from being covered with the eruption, that brushing, or combing, or washing is barely possible. Besides which the hairs are so much loosened by the purulent condition of the skin, that they are easily dragged out in handfuls, almost by their own weight, if long. This forcible dragging out injures the hair-bulbs, so that they will not sprout again. And it also still further inflames the scalp. So that the best chance for saving the hair is to cut it short, since shaving the head is out of the question from the pain it would give.

(*Clinical, St. Mary's, February 5th,* 1863.)

An order from the weekly board to empty the beds and clear the wards, on account of the late spread of smallpox among our inmates, leaves me no patients to lecture upon, so I will make a virtue of necessity and give you a few more remarks on the cause of this misfortune.

Since I took variola as my text three weeks ago, seven more persons have contracted it within our walls. They have had it

in various degrees, and two have died. But as none of them have been under my charge, I have not their symptoms to comment upon. Among the seven was one of yourselves, a house-surgeon, who had prudently revaccinated himself when he found the disease was spreading. Whilst the vaccine pustule was forming, he found his body overspread with an erythematous blush, which he thought at first to be scarlatina, but it soon showed itself to be only the forerunner of a variolous eruption. This precautionary vaccination was not then completely successful. But his attack of smallpox has been very slight, it has not confined him to bed, and the few scattered pustules are dying off without causing any inflammation of the skin. The protection, though not complete, was probably still useful.

To be of use, the poisoning by vaccinia must precede that by variola. The eruption of the first must be formed before the fever of the second comes on. This is not my own statement, but derived from the experience of Dr. Munk, the accomplished physician to the Smallpox Hospital, and it is what one would *à priori* have expected.

You must be careful not to look upon vaccination as in any way antidotal or remedial to smallpox. It is not a case of a smaller and slighter disease curing a severer one already existing; otherwise it might perhaps be taken as evidence in favour of either the homœopathic or counter-irritant theories. It does not cure it, or even modify it when already existing. The rational view of the relation of the two is this: there exists in the living body a certain unknown constituent, which, coming into contact with the virus of vaccinia or variola respectively, is capable of being converted gradually into that virus, just as surely as a thousand hogsheads of malt-sugar may be converted into alcohol by an ounce of yeast. But when it has once been thus converted and passed away, there remains nothing for the virus to act upon, and it is consequently harmless. Vaccinating a child is an act done on the same principle as cutting off the dew-claw from a puppy, lest it should lead to inconvenience in after life. We exhaust or obliterate a useless substance which might lead to evil. To call it a remedy in the sense in which medicines must be remedies for disease is like calling the

removal of the dew-claw a cure for a torn leg, or to talk of putting out a conflagration by previously removing the inflammable furniture. Prevention is not cure, however much better it may be.

It is obvious that the modification of diseases on the same principle as vaccination is applicable only to those which occur but once in life. But there is no reason for the world to despair of seeing scarlet fever and measles rendered as rare, at least, as smallpox, by some analogous means. Any plan which offers a reasonable chance of success will not now find sceptics to oppose it before trial in the ranks of our profession.

The way in which the smallpox has spread, in spite of our efforts at quarantine, shows you how very infectious its nature is —how much more infectious than scarlet-fever, measles, erysipelas, or typh-fever.* I have placed them in the order in which, in my judgment, there is risk of communication from one person to another—viz.: scarlet-fever, measles, erysipelas, typh-fever. Of scarlet-fever and measles, most cases are treated at

* I had a striking instance a few months ago of the almost incredible contagiousness of smallpox. A lady about to be confined summoned her monthly nurse on October 29th; on November 1st her child was born; on November 12th an eruption of smallpox appeared on it, and went mildly and regularly through its regular stages, affecting the child's health very slightly. The interest of the case lay in tracing the history of infection; for it is obvious that, allowing two days' fever and twelve days' latency, which are invariable in an unprotected person, the virus must have been communicated two days before birth. Every one who had been in the house positively denied having seen anybody affected with the disease, and the mother had not been in a street cab for weeks previously. At last it was discovered that after the monthly nurse had left her last place, the child she had been bringing up sickened with smallpox and died, and the infection was traced to the household of the family washerwoman, whose daughter had been laid up with an attack so mild as to be capable of concealment. The travels of the virus were, then, as follows. A (the washerwoman's daughter) developes it; it is carried in the clean clothes B to the household C, from whence, before it has been redeveloped or multiplied by the child who died, it is carried by the nurse D to the pregnant lady E; E, being protected by vaccination, does not exhibit it, but passes it on to the child in her womb F, within twenty-four hours after she first saw the nurse and two days before it came into the world. What a notion this gives of the infinitesimal subdivision of matter, and also of the powerful protection afforded by vaccination, which guarded the mother's body, through whom the virus passed without the slightest injury.

home; we have not a dozen cases of each in the wards annually. Although I must allow that a good many instances have occurred of scarlatina spreading, yet, as a rule, we are able to retain the patients in the general wards without its doing so, by the simple precaution of allowing an interval of eight or ten feet between the scarlatinous bed and the next. So that, without expressing an opinion as to the propriety of admitting scarlatina into a general hospital, I do not think the matter of sufficient importance to exclude them by law. Of the communication of erysipelas, again, most of you during your pupilage see just an instance or so which serve to illustrate the fact. We have not enough cases in the wards to supply many examples. But of typh-fever we are seldom free, seldom indeed are we long without having many more than we like at once. Had it the virulence of smallpox, which of the patients, which of the physicians or students, unprotected as we are, could possibly escape? Only an occasional rare exception, just enough to prove the facts by tradition among you, occurs of its being contracted in the hospital. I can recollect only three instances in my practice of such having been the case.

But smallpox, in spite of the protection of vaccination, hardly ever comes among us without leaving a virus which is most difficult to eradicate. Each time that a patient has slept a night in the house several others have taken it, each time has a house surgeon been infected, and we have got rid of the plague only by dint of clearing the wards, whitewashing, and painting, as we are now doing.

Being infectious, then, is not an absolute quality of a disease, requiring some one and absolute means of prevention. It is comparative, and has a very different meaning whether it is applied to smallpox, or to yellow-fever, or to scarlatina, measles, typh-fever, glanders, syphilis, itch, &c. The means need to be applied in very different degrees according as one or the other of these complaints are to be provided against.

The principle indeed involved in the most important of these measures is the same; it is dilution of the virus which is the cause of disease, by air and water, before it can come in contact with any focus of increase, that is to say, with any human body. Chemical "disinfectants" (so called) are useless, unless applied

in such quantities as really to be diluents; and being useless, are dangerous, lest they should be trusted to and exclude the employment of the really efficient agents. If you advise the use of them at all, select the most disagreeable in odour, that thus the servants may be driven to dilute the poison by diluting the disinfectant. It has been coarsely but truly said that chloride of lime is good, for "it makes such a stink, that you are obliged to open the windows."

LECTURE XI.

RHEUMATIC FEVER.

Relations of the practitioner and lecturer to rheumatic fever—Description of treatment—(1) *Bedding*—(2) *Fomentations*—(3) *Remedial agents—Bicarbonate of potash, Iodide of potassium*—(4) *Opium*—(5) *Leeches*—(6) *Poultices in pericarditis*—(7) *Diet — Commentaries on the restorative agencies of the aforesaid treatment.*

(*Clinical, St. Mary's, May 24th,* 1862.)

Rheumatic fever is a pleasant disease—I mean for the doctor to treat, though not for the patient to bear. It is pleasant for him to treat it, because he then feels himself strong and useful. In the first place he can, by the judicious exercise of his art, ensure the sufferers against several perils to which the nature of their complaint exposes them. Again, he can save them much pain. Thirdly, he can shorten the otherwise long duration both of the illness and of the convalescence. Truly in most diseases he can effect one or other of these objects, but in none I think so many of them, so surely and so simply, as in rheumatic fever.

Rheumatic fever is also a pleasant disease to lecture about. It presents an unusually uniform type, so that the short descriptions you have had in the systematic course of lectures on the practice of medicine are found really applicable at the bedside, without the necessity for guarding them with all sorts of exceptions and variations, which clinical teachers are so often obliged to resort to in other cases. The classification I adopt points to a difference rather of degree than of essence, viz., "acute rheumatism," or rheumatic fever, where

there is febrile reaction, shown by furred tongue, &c., and "subacute rheumatism" where there is none. And a very simple uniform treatment may be recommended, which hardly ever requires modification. So that if your authority with your patient is sufficient to enforce due obedience to orders, and you are certain of your diagnosis, you need have but little anxiety about the result.

There are hardly ever absent from the wards specimens of the mode of treatment I adopt. My present business is to tell you my reasons for the plan pursued.

But first let me speak of the plan itself.

1. The patients' bed is made in a peculiar fashion. It is a standing order that no linen is to touch the skin. A slight calico shirt or shift may be allowed; but if the patients possess underclothing only of the prohibited sort, they are better naked. Even a linen front to the shirt is dangerous. Sheets are removed, and the body is carefully wrapped up in blankets, which are so arranged as shut off all accidental draughts from the head. The newest and fluffiest blankets that can be got are used.

The bedclothes being put so, are kept so, and the attendants and students are warned that when the sounds of the heart are listened to, they must not throw off the wrappings, but insert a stethoscope (first warmed) between the folds.

2. Those joints or limbs which are swollen, red, or painful, are wrapped up in flannels soaked with a hot fomentation consisting sometimes of plain water, sometimes of decoction of poppy heads with half an ounce of carbonate of soda to each pint.

3. The following drugs are prescribed with a curative intention.

(*a*) If the skin is red, swollen, and painful about the joints—if the cellular tissue around the muscles is infiltrated and sensitive, so that motion is impossible or exquisitely painful—more especially if these phenomena are metastatic, leaving one part free and attacking another;—patients have then the "alkaline treatment" pure and simple: they have a scruple of bicarbonate of potash in camphor-water every other hour, night and day, when awake.

(*b*) If the above symptoms are insignificant, and the pain is felt more in the bones—if it is intensified rather by pressure than by motion—if it is fixed in one spot and not metastatic; —then I add two grains of iodide of potassium to each dose; and directly the symptoms have taken a turn towards alleviation, I leave off the alkali altogether, and give only the iodide of potassium.

4. Opium is given in exact proportion to the degree of subjective sensation of pain. If one grain be not enough to entice sleep, a grain and a half is administered; if that do not avail, two grains. Directly the pain is relieved, the quantity of the drug is diminished. Nothing effects the desired object so well as pure opium in pill or in tincture.

5. If the pain remains fixed in one joint, instead of leaving it as it leaves other places, leeches are applied there, and the part is kept poulticed. Sometimes bruised laurel leaves are mixed with the poultice.

6. Leeches and poultices are also applied to the cardiac region, if the heart has become inflamed either inside or out. The pain felt is taken as an indication of the extent to which the leeching is to be pushed, so soon as it is proved by auscultation that such pain arises from inflammation of the heart, and not from rheumatism of the pectoral muscles. The constant application of the poultice is made imperative after the leeches.

7. The diet is varied in some degree according to the social and personal state of the patients. If they have been hearty, well-to-do persons before the attack, they will bear a good deal of starvation, and are accordingly put on our "simple diet;" to wit, bread-and-butter, gruel, and tea. If previously they have been ill-nourished, by reason of either ill-health or poverty, or if they have been ill for some time, a pint of broth or beef-tea is added.

I will now proceed to comment on the several items of treatment in the order in which I have placed them.

1. *Bedding.*—It is impossible to make too much of the value of absolute rest and an evenly high temperature to the skin in rheumatic fever. They are worth all the other means of relief put together. Since I have succeeded in getting our nurses to adopt them as a universal rule in every case of rheumatic fever,

without exception, I have had hardly any patients to treat for inflammation of the heart.*

The rationale of the action of warmth is very simple. Rheumatic inflammation is an injury to nutrition which is entirely compensated for by the restored function on return to health. Rheumatic inflammation passes away and leaves no after sign, no wound, no scar. This only happens, however, if the parts affected are kept perfectly still. Should duties be asked of them which they are unable to perform in their imperfect condition—should necessity or ignorance lead the patient to keep moving a swollen joint, for example—then common inflammation is superadded. Then the pain and swelling become fixed, and no metastasis can take place. You see this frequently in poor working people, who, through need or ignorance of what is likely to follow, strive to go on with their business up to the last minute. Labourers come into the hospital with the disorder fixed in their knees, carpenters in their elbows, laundresses in their wrists; so that you may make a shrewd guess at their trade from the part where the disorganizing inflammation is situated. Pain may be called the proof of beneficent design in God's laws as shown in disease; it is a warning to withhold one's self from that which excites it. The pain of rheumatism is a call to voluntary absolute rest. Now, in the joints this is easily obtained, and, under any treatment you hardly ever see disorganizing inflammation begin in a joint after a patient has once taken to his bed. But there is one organ whose business admits of no rest;—the heart must needs keep beating at whatever cost;—and the heart accordingly is well known to be fatally apt to be struck with common fibrinous inflammation at all stages of rheumatic fever. Taking a lesson from what I have noticed in the joints, I try and assist the heart to gain, not of course the Utopia of absolute rest, but the nearest approach that is possible.

Perhaps you may think that object would be gained by simple confinement to bed in the horizontal posture. It is not so. Next to jumping and running, there is nothing gives the heart so much work to do as alternations of heat and cold. Let the physiologist observe the healthy organ, let the physician

* On this point see the statistics in the next Lecture but one.

examine it in a state of disease, and they will find that a change of temperature on the surface of the body is followed by a longer and stronger stroke as felt by the finger, by a longer and stronger sound as heard by the ear in the cardiac region. The interval between the strokes is shortened; and thus is encroached upon the only wink of sleep the hard-working muscle ever indulges in. What does the accoucheur do who wishes to apply the strongest vivifier to the dormant nerves of a still-born baby? He dashes cold water and cold air on the skin,—he rubs the chest dry and applies hot cloths apace,—again he dashes it with cold,—making as many changes as he can. What the accoucheur is so anxious to accomplish there, we are most anxious to avoid here; and I feel sure that it is by virtue of screening patients with rheumatic fever from the influence which variations of heat and cold have over the dependencies of the pneumogastric nerve that the treatment now advised is so successful. I never have pericarditis come on when it is once fairly begun and persisted in.

I scarcely need to say that the most important part of the person as respects the attainment of the accoucheur's object, and our opposite object, is the chest. There he applies his "stimulus," and there we must as carefully watch against it. A patient of mine at this hospital (year 1859, No. in Reg. 711) got pericarditis by being dowsed with cold water on the face and neck for an hysteric fit accidentally occurring during convalescence from rheumatic fever. And as a student I used to see many and many a case of pericarditis brought on by the careless way in which the thorax was bared in the daily stethoscopic examination. It is doubtless necessary to listen to the heart thus often, in order to convince ourselves of the absence of morbid sounds: but by warming the stethoscope in our pocket or under the axilla, and making the blanket into a tube by which to insert it, we cause the least possible degree of danger, and avoid the merited accusation of meddling to the patient's hurt.

You saw a fortnight ago an instance of the danger of the exposure I have been deprecating. Margaret K., aged 23, was admitted March 28th for rheumatic fever, with swellings in the arms and legs; from this she recovered perfectly without any

affection of the heart, and was transferred to the convalescent ward. On April 17th she had a relapse, principally affecting the legs, and on the 19th I found her in bed again. By an oversight she had not been blanketed, and when I felt the cold sheets damp with the patient's perspiration I was not surprised that she complained of constriction across the chest. You heard me rebuke the nurse in no measured terms, and prognosticate evil. With justice; for before two days were over there was a melancholy systolic murmur distinctly audible. I trust this case has been a warning to you.

2. *Fomentations.*—By comparing in occasional cases one limb wrapped in fomentations of simple hot water, with another where decoction of poppy-heads was used, I have come to the conclusion that either the viscid vegetable matter, or the small quantity of opium in the poppy-heads, contributed towards alleviating the pain a little. And a similar experiment has led me to the same opinion as respects an alkaline carbonate. But the heat is the most important element in this part of the treatment. Look well after your nurses, and see that they keep the fomentation warm.

3. *Curative Drugs* (*a*).—With unimportant exceptions, I have treated every patient for the last seven years with bicarbonate of potash, being convinced of its power to shorten and alleviate the disease by daily experience as well as by the statistical deductions of Dr. Garrod. In a great majority of the cases very rapid relief commences with the commencement of the treatment, and continues permanent. But in a certain number no effect appears to be produced, sometimes even after the urine has been made alkaline. In a few of these there has been committed a pardonable error of diagnosis,—the patient is gouty. In a few, also, we are deceived by gonorrhœal rheumatism, a disease allied to pyæmia, and requiring quite different management. Still there are a certain number of instances where true rheumatic inflammation is very obstinate and does not yield to the alkaline method. And in these you will find the periosteum and pericondrium affected. When the patient, then, after five or six days of the alkaline treatment is no better, or but little better, I add, as I told you, iodide of potassium to the potash, and in a few days more continue the iodide alone during

the convalescence. Of course, if I am enabled to make this condition of the periosteum out at the first visit, I begin such treatment forthwith.

I mentioned just now that I had, in a few instances, for exceptional reasons, not given the alkaline treatment for rheumatic fever. Among those are included a middle-aged labourer and his wife, both attacked together and just recovered, in which cases you saw no drugs given during the acute stage. The object of this omission was partly to test a suspicion that the alkalies might cause or augment the anæmia and weakness so general in the convalescence of rheumatic fever, or perhaps might give rise to relapses by checking the course of the disease. These two cases did much to disabuse me of that fear. We saw that the loss of flesh and strength was in both husband and wife as great as usual, if not greater than in the majority of examples which come before us in the wards—satisfying us that it is the disease, not the remedy, which is to blame for the usual emaciation and weakness. We saw, also, that one of the patients (the man) had a relapse, showing that to nature and not to art is to be attributed this unfortunate occurrence so frequent in rheumatic cases.

Partly also in these two cases I omitted drugs to use them as a pretext for reminding you that you do not carry in your medicine chests any absolute or indispensable powers—to show you that rheumatic fever is a state in which the forces of life move in a circle, in a road which leads of itself back towards health—and is not a chronic disorganizing process, whose path may be drawn as a straight line, approaching nearer and nearer to death the farther it goes. It ends of its own accord, or at all events without the aid of drugs, often in a few days, often (as you saw here) in a time quite as short as could have been expected had medicines been administered. This consideration is needful to enable you to rate duly the value of numerical arguments, and to understand that a very large collection of cases, much larger than any experience in private practice ever can supply to you, is needed to prove the ability of a drug to shorten rheumatic fever. If you forget this, you risk being misled by a fallacy, with an instance of which applied to experience of this very disease I was amused a few years ago. I had an interview with an irregular practi-

tioner (very irregular indeed), who told me that he gave no medicines, but followed "the method of St. James"— he "anointed with oil them that were sick, and the Lord raised them up." As proof of the success of his plan he gave me the history of two attacks he had undergone of rheumatic fever. In the first he was treated professionally, and was laid up for more than three weeks; in the second he obeyed the perversion of Scripture above quoted, and was out of bed in five days. Of course he was perfectly impervious to argument.

Do not misunderstand my words, or interpret them as if I intended to ridicule the proof brought by Dr. Garrod of the success of the alkaline treatment in shortening the average length of our patients' pains. I think his calculations fairly prove that point, though they do not show that the whole duration of the disease is less. But my principal reason for adopting them is that the use of such drugs is quite in harmony with the principles of restorative medicine. The deficiency of alkali in the body is shown in all quarters by the appearance of free acids. In indubitable cases of rheumatic fever left without treatment the sweat is acid, the saliva is acid, the urine, instead of being moderately acid, is intensely acid, the breath even smells acid. The blood, indeed, remains alkaline, fortunately for the life of the patient, but that is only done at the expense of becoming exceedingly watery, and producing the anæmia which is so characteristic of the convalescence of rheumatic fever. If the blood is aqueous, and contains less solids than normal, at the same time that the salts bear their usual proportion to the rest of the solids, it is obvious that there must be a great deficiency of those salts in the body. Though the blood be not acid, it is easy to understand that it carries less alkali than it ought to do.

A real deficiency is attempted to be replaced by the carbonated alkali. And when we think how great is the mass of living matter over the whole of which this great deficiency exists, then is explained the need for large and repeated doses, which all good observers insist upon. To give a few grains three times a day is mere playing at healing, and cannot be reckoned as treatment at all. I do not think anything less than half an ounce of the bicarbonate of potash in the twenty-four hours is of real

use. Again, if this runs off straight by the kidneys, making the urine alkaline too quickly, it is of little avail; but if it mixes with the mass of the corporeal fluids, and is some time before it is found by its alkaline reaction in the renal secretion, the good effect is sensibly felt by both the patient and his attendants.

Again, I do not think it a fair trial of the treatment to give the potash neutralized by an acid, as tartaric or citrate. These salts may be good for rheumatism, but they do not test Dr. Garrod's statistics. And similarly, larger doses at longer intervals do not fulfil the indications.

A collateral advantage of frequent doses is the more attentive nursing which it ensures. In these oft-repeated visits the attendant looks well after the arrangement of the bedding, sees that no part is left exposed to the air, and as our naval friends say "makes all taught."

(*b*) The employment of iodide of potassium is more empirical. By none can the fact be explained that this remarkable substance restores their normal functions to several tissues—most notably to those sparingly supplied with blood-vessels, such as cartilaginous and white, hard, fibrous parts, the periosteum, the sheaths of tendons and of nerves—and even influences the hair, the nails, and the outer layers of skin. Iodide of potassium is of signal service when rheumatism or gout attack the tendons or the thecæ enclosing the muscles and tendons. I think we cannot doubt the words of the sufferers when they say that they feel the better for it, however inexplicable the fact may be.

The earlier in the disease that iodide of potassium be given the quicker it acts. You may see this to be the case in syphilitic periostitis, which when recent, yields rapidly, and when of long standing, yields but slowly, to the influence of the drug. So is it in rheumatism; the old chronic cases are aided by iodide of potassium, indeed, but prove as a rule very obstinate; whilst this affection of the white fibrous tissues which follows rheumatic fever, and which we are now concerned with, is usually removed in a few days, because it is taken in hand at an early period.

4. *Opium.*—This is given purely as an anæsthetic. There is no reason to think it either shortens or lengthens the time the

disease lasts. Curiously enough, it does not usually stop the action of the bowels so long as the painful condition remains which it is given to lighten. Should constipation follow, the inconvenience is easily obviated by adding two or three grains of good extract of colocynth to the opium pill.

5. *Bloodletting.*—The treatment by leeches and poultices of the common inflammation which may sometimes over-ride the rheumatic in joints moved about during their weak state, has nothing special about it. It may generally be depended upon to prevent disorganization, because in point of fact the inflammation is very slight and diffused.

6. *Carditis.*—I have told you inflammation of the heart does not come on in patients who have once been placed and kept under the treatment detailed to you. But in a good many instances the exposure the poor people have been subjected to previously, and sometimes the necessary time spent in our waiting-room, gives you an unlucky opportunity of seeing me treat this complication. If it is found out within twenty-four hours of coming to the hospital, it is of course registered as due to the circumstances I have named, and our nursing is not to be blamed for it. I feel satisfied that it need make no difference in the applicability of the alkaline method; indeed it rather strengthens my resolution to insist on this being fully carried out. It determines me also to be more than usually watchful about the maintenance of temperature by blankets, and to take care of the chest in special by continuous poultices. When cardiac symptoms are detected, when there is friction or a murmur detected by the ear, or even when pain is felt on pressure of that vital part, from six to twelve leeches are forthwith applied; these usually relieve the pain somewhat; but if it returns again next day, they are to be repeated, and this may be done again and again, as long as pain lasts. The pain is the best measure of the acuteness of inflammation in serous membranes; and so long as acute inflammation remains, leeches and poultices are the best remedies for it.* To mercury I have never been able to trace any advantage at this stage; indeed, I am not sure that it does not dispose to pericarditis by increasing the proportion of fibrin to the other constituents of the blood. Perhaps after

* This subject is fuller treated in a subsequent Lecture.

effusion has taken place it may be useful, but I am not quite satisfied that it is desirable in all cases even then.

Opium may be given in full doses; and far from being contra-indicated on the score of cardiac inflammation, it is all the more urgently called for. For it certainly does control and lower the hurry of circulation which is so dangerous. Under its use the pulse is diminished in frequency, sometimes even below the normal standard; and this must surely be an important object in a diseased state brought about by the continuous motion of the heart.

The treatment of pericarditis brooks no delay. Lost minutes are more hurtful here than in any disease I know of. Send for leeches and have them applied immediately that your suspicions are aroused by an abnormal murmur, and if they are not at hand, cup the cardiac region. It is better even to anticipate evil than to be too late. On this principle you saw me a fortnight ago leech and poultice the heart of the young woman before mentioned (case of Margaret K.), where you could hear no friction in the pericardium, and you wondered at my "sharp practice." But the fact is, it was a case of relapse; and as the patient slept in the convalescent ward, the nurse carelessly neglected to wrap her in blankets: the cold damp linen was beginning to do its work, and the lengthened heavy stroke of the left ventricle, accompanied by a sense of tightness and pain on pressure, warned me to try and prevent the threatened inflammation. I was only partially successful; the foreseen evil did come; in two days' time an exo-cardial murmur was distinctly heard. But I am sure the pericarditis was in a much milder form than it would have been had leeches not been applied.

7. *Diet.*—In rheumatic fever there is a painful necessity for restricting the supply of an important class of nutriment. If meat be given, it seems to turn into lactic acid, at all events it adds to the quantity of organic acids in the body. The power of fully converting it into living flesh is wanting, and until this power is restored, a semi-conversion into the substance named takes place.

Even when the pains are gone and there is such an urgent call for replacing lost flesh, the most suitable diet for supplying

it will sometimes bring on a relapse. Hence I find it needful to give patients less food than their feelings prompt them to take. The redder and more muscular it is, the more it seems to disagree, and you must very cautiously get back to "ordinary diet," else you run a risk of losing more by a second attack of the disease than is to be gained by haste. Vegetable matter does not expose patients to the same danger, and thus by dint of rice pudding, porridge, gruel, bread, mashed potatoes, and the like, you may try to satisfy the mouths which often loudly complain of starvation. If, however, you cannot, by such persuasion, succeed in staying the appetite, it is your duty to be cruel, for observation will soon convince you of the hurtful effects of animal food in causing relapses.

LECTURE XII.

RHEUMATIC FEVER.

Exceptional cases of rheumatic fever—Inflammation of heart arrested by epistaxis—Delirium and gangrene in rheumatic fever—Treatment—Case of rheumatic fever in a tubercular subject, with consecutive purpura of the legs—Treatment by lemon juice.

(*Clinical, St. Mary's, June 27th,* 1863.)

A YOUNG woman with rheumatic fever in the corner of Victoria Ward was found the other day by the house surgeon, Mr. Mahon, to be suffering from pain in the cardiac region increased by firm pressure. Although he could detect no abnormal sound on auscultation, yet he thought it advisable to order half a dozen leeches to be applied to the part. He was wise, I think, in so doing; for the course followed by inflammation of the heart in rheumatic fever is this;—first the rheumatism, such as you see it and feel it in the limbs and joints, settles in the heart, just as it might settle in any other part, and as in any other part without common or disorganizing inflammation;—but, as in any other part, motion will change the rheumatic into disorganizing inflammation; and therefore as you cannot stop the heart's motion, you must try and get rid of the rheumatism quickly, and for the time only perhaps, but at any rate for the time, from this dangerous locality. And you must not mind making some sacrifice to accomplish such an important object. Now, local bloodletting does do this even in the joints, only that it is not in general worth while to get rid of the rheumatism, out of the knee for example, when in half an hour it may come on just as bad in the hand. But in the case of the heart it is worth

while, well worth while, to do much more (if wanted) than putting on a few leeches.

But do the leeches really prevent it in a natural and physiological way? This case has shown you that the treatment is entirely in accordance with nature (if that is any recommendation) and reasonable physiology. Though ordered, the leeches were not put on—and why? Because in the meantime the woman's nose burst out bleeding, and that event entirely relieved the pain in the heart, and most completely justified the prescription which had been written.

I do not want you to accept the epistaxis as an "effort of nature," designed to relieve threatened carditis; for, as a matter of fact, any idiopathic hæmorrhage is very uncommon under such circumstances—but as a fortunate accident. If it had any design at all, it was designed to teach you medicine; to teach you that a very moderate loss of blood may avert a great danger.

But I have spoken of loss of blood even in moderation as a sacrifice. And it is so peculiarly in rheumatic fever. The disease is one which *cæteris paribus* attacks the weakest persons at their weakest times; women, children, the aged, the debilitated by sickness are the most liable, if exposed to the usual causes. And not only the weakest persons, but the weakest parts of those persons. I admitted a man named Amos F. into Albert Ward on June 12th, with rheumatic fever. Two years ago he was in this hospital for paralysis of the right arm and leg, in consequence of some cerebral lesion probably, and he has never recovered full power in the upper extremity. Since then he has had rheumatic fever twice, this being the second occasion, and both times the right elbow and hand have been the place first affected, and the place longest and worst affected both with pain, and swelling, and redness. If then rheumatic fever affects by preference the weakest flesh, it is right to view everything that weakens the flesh a sacrifice. In that light we must consider loss of blood, prudent and wise though the sacrifice may be.

(*Clinical, St. Mary's, October* 31*st*, 1863.)

Exceptional cases occur seldomer in rheumatic fever than in any other disease I can at this moment call to mind. Yet they do occur; and there is now in the wards one noteworthy instance of rare symptoms and rare treatment, both markedly different from what I have described as those of at least ninety-nine out of a hundred of the patients you will have. For this hundredth case you ought to be prepared.

The fever of acute rheumatism bears the type which our grandfathers called "synocha," and our fathers "inflammatory;" that is to say, the relations of the senses and the mind are not impaired in the direction of either obtuseness, coma, or delirium; there is no tendency to the local death of tissues or gangrene; and the congestions which may intervene result in active and fibrinous inflammation. But occasionally it exhibits, from the very beginning, the character of typhus; the nervous system is deeply affected in its most important functions, there is an excessive depression which may end fatally, and a great danger also from sloughing of the parts compressed in the recumbent posture.

Such are the peculiarities in the instance of George R., received as an urgent case in the middle of last week, October 21st. He is a wiry little letter-carrier, only twenty-four years old, who has never before suffered from any serious illness. He has a happy home, and a merry affectionate wife; is active, prosperous, and intelligent, employing his leisure in playing the organ at a neighbouring church. I recount these particulars to show that his antecedents are not of a noxious kind. On the 7th of October he cleared out a dirty cistern and got very wet and cold. On the 9th he felt out of sorts, and took a hot bath. This exhausted him, and he also got chilled in coming home. Pains in the limbs came on, and on the 11th he was laid up in bed with increased pain accompanied by swelling and redness in the joints. He then had another hot bath, after which he was still worse. His wife perceived then that his mind began to wander from time to time, and before his admission, on the 21st, the delirium was constant and of a violent character. The

wrists, hands, one ankle, and the other knee, were red and much swollen, and in the knee-joint the fluctuation of fluid could be felt. But during his ravings he moved these limbs about, seemingly regardless of the pain which is usually so acutely felt in rheumatic fever. His tongue was of a yellowish brown and nearly dry, the lips and teeth were parched and brown with sordes. The skin was sometimes dry, sometimes bathed in a profuse sweat of a rancid, sour odour. His chest was covered with a copious eruption of sudamina. His pulse was variable, seldom above 100, however. His bowels were constipated; but after a dose of castor oil they were normal in action. A stethoscopic examination of the chest proved the heart and lungs to be free of any inflammatory lesion, their sounds being quite healthy. He became so noisy and violent at night that he was obliged to be moved into a room by himself, and then his delirium assumed a more rambling form, and he made no more spasmodic attempts to get out of his blankets.

I saw him the next day, the 22nd, and ordered—℞ *Opii, gr. j. omni nocte.* ℞ *Potassii iodidi, gr. xv; Ammoniæ sesquicarb., gr. iv; Decocti cinchonæ,* ℥j. *4tis horis. Six ounces of port wine daily, and a cup of beef tea every two hours.*

His delirium and low typhous symptoms continued till the 25th, but on the 24th he was sufficiently quiet to be moved up into the ordinary ward. On the 24th the spine of his back was noticed to be red, and on the 28th it is noticed in the case-book that a small slough had formed on the sacrum. His tongue however had got quite clean, and he had not been delirious since the 25th. The pain, swelling, and redness had all disappeared at that date.

Such is the history of a more than ordinarily satisfactory termination of typhous rheumatic fever. I have seen several end fatally, and was at first very anxious about this young man, and was all the more anxious from some answers he gave to our first questions having induced a notion that he had been suffering recently from gonorrhœa; and I thought it just possible that we might have to amend our diagnosis, and that it would turn out a case of urethral pyæmia affecting the joints. This unworthy suspicion was however taken away by the indubitably correct account his wife was able to give of his freedom from

that disgrace, and his own assurance when he recovered his senses.

You may have remarked that in relating his history I implicitly attributed some part at least of the severity of the disease to the hot-water baths taken. Possibly you may think this accusation of mine somewhat inconsistent with my keeping rheumatic fever patients in a sort of perpetual warm bath, by wrapping them up in fomentations and blankets; so I take this opportunity of teaching you that the two operations are not only essentially different, but essentially contrasted with one another. A hot-water bath involves two great changes of temperature, a rapid one from the original heat to a degree above the original, and a slower cooling afterwards. Packing in blankets with continuous fomentations not only keeps the production of animal heat even, but it also defends the patient against external variations. So that where one does good, we may reasonably conclude that the other does harm.

About the treatment I do not wish to say much, except that it was in the highest degree stimulant and nutritious, in marked contrast to that which I find adapted to ordinary cases of rheumatic fever. I have never administered iodide of potassium before under the same circumstances, but I think I shall again. Bark and ammonia alone I have given on former occasions, but not with equally good results.

You will have observed that my first act on hearing the history was to apply my stethoscope to the heart, and then to the lungs, although there was no account of any symptoms referrible to those viscera. The fact is that delirium, which is the secondary result of pneumonia or pericarditis in rheumatic fever, usually masks its cause, and violent inflammation may go on without showing any external evidence of its presence. It is right therefore to look for these local inflammations, for in point of fact delirium of such an origin is more common than that which we see here with lungs and heart healthy.

The delirium in both cases I believe to be of the same nature, to be in itself indicative of the same pathological condition of the nervous system, and to be suggestive of the same line of treatment, whether it exists along with thoracic inflammation or without thoracic inflammation. I believe it in-

dicates a threatening of death by the nervous system, which must be warded off as you have seen it warded off here. It is only when rheumatic pneumonia and pericarditis have gone too far to admit of depletory or debilitant measures, or occur in a frame already disposed to typhous depression, that they impair the cerebral functions. When therefore delirium supervenes, I would advise you to treat any inflammation of the heart or lungs which you may find with it, in such a way as not to interfere with your bark and your wine and your opium.

There are two ways in which the pathology of these low forms of rheumatic fever may be explained.

First, it is not impossible that a zymotic poison may enter at the same time with, and combine to form a new compound influence with the influences which originate the rheumatism. And such an explanation would chime in very well with the history of the case under our eyes; for the man says his ailment was caused by cleaning out a foul cistern, where decaying organic matter would be the suitable birthplace of febrile malaria. But I have not been able to trace this kind of evidence in other instances.

Secondly, we may view it as an imitation rather than as the child of typh-poisoning. The symptoms by which we recognise the action of that virus are especially exhibited in the nervous functions—the rigors, the languor, the delirium, are witnesses of death in the nerves—and when such death in the nerves is due to other causes, the same symptoms arise. Hence you have the low, or typhous, state arising after severe injuries of all kinds, when the destructive consequences of those injuries arrive at the nervous system. This may, under special circumstances of which we are ignorant, be the exceptional case in rheumatic fever.

Neither view modifies the treatment.

(*Clinical, St. Mary's, December 12th,* 1863.)

In Cambridge Ward is an example of rheumatic fever, which has lain in the hospital longer than the usual time, and is not yet fit to be discharged. The patient is a carman; John H.,

aged twenty-six, admitted November 7th. The peculiarity that distinguishes it from the ordinary run of cases is, that he has consolidation, detectible by bronchial breathing, and presumably tubercular, of the upper lobes of both lungs, and copious muco-purulent secretion from the bronchial membrane (chronic bronchitis) in consequence of it. Whenever he is put upon low vegetable diet and sweated in blankets, his rheumatic pains and swellings of the joints subside as readily as do those of other patients; but then he grows terribly weak, and the expectoration increases in quantity and purulence, so that we have to give him full allowance of animal food and quinine. This brings back the semi-acute swellings and pains, with sour rheumatic odour in the sweat, and even some degree of fever. Iodide of potassium has not prevented these relapses, which have occurred three times.

In examining his legs on the occasion of the last relapse, I found around the ankles a copious crop of pin-head specks of purpura. On this indication, I ordered him three ounces of lemon juice daily, and the treatment seems to succeed very well, for he is gaining strength now without relapsing, although eating meat daily.

Had this man been treated by alkalies, it is most likely some of us would have attributed his purpura to that cause. But the rheumatism, in its acute stage, was alleviated only by the usual blanketing and low diet. And moreover I take this opportunity of saying that, whatever may be the defects of the alkaline treatment (which I am not going to discuss now), the production of purpura is not one of them. I have not seen such scorbutic condition more frequently among rheumatic fever patients so treated, than among others.

This seems to me just one of those specially circumstanced cases of rheumatic fever where lemon juice is suitable, and I think that it was from the obvious advantage derived from it in similar instances that its credit as a remedy has been gained.

The difficulty of trimming the dietary where one complaint is to be benefited by starvation and another by high feeding is very great, and it is a most fortunate circumstance that this combination is rare in the case of rheumatic fever, which seldom occurs in consumptive persons.

LECTURE XIII.

RHEUMATIC FEVER.

Therapeutical statistics.

(*Clinical, St. Mary's, January 9th,* 1864).

Statistics, like many other excellent things and people, are apt to prolong themselves into bores, and in so doing lose much of their legitimate force. It will be my aim therefore to make this lecture as short as I can.

Between June 1851 and Christmas 1863 there have been in the wards under my care at St Mary's 257 cases of rheumatic fever. Of these (cases under treatment on Christmas day not being included)—

26 were treated with ʒj. of nitre three times a day;—

174 were treated with bicarbonate of potash—viz.,

141 with ʒj., or more, every two hours;—

33 with a less quantity;—

32 were treated, during the first year, in various other ways;—

25 (that is to say, all since May last) have had none of these supposed curative drugs;* only a little opium when

* I suppose it is natural, as one advances in years, to adopt milder and milder methods of treating rheumatic fever. Sydenham did so. In 1675, the date of the third edition of the 'Observationes Medicæ,' he was trying the "curatio repetitis venæ-sectionibus:" in 1680 he writes to the Warden of Caius College, Cambrige, "verosimile esse judicabam morbum diætâ simplici, admodum refrigerante, et mediocriter nutriente, agro imperatâ, æque feliciter ac repetitis venæ-sectionibus profligari posse; etiam evitatis, quæ alteri methodo adjungebantur, incommodis: neque me fefellit diæta e sero lactis phlebotomiæ loco substituta." This is repeated in the revised edition of the "Epistolæ Responsoriæ," date 1685.

the pain was very severe, and a purgative when the bowels were abnormally costive.

No selection of cases was made, but each method was adopted in every case for a time.

1. *Results of drugs on the duration of illness.*

Of the 26 treated with nitre the mean stay in hospital was 40·0 days.

Of the 141 treated with the ℈j. bihoral doses of bicarbonate of potash, the mean stay in hospital was 34·3 days.

Of the 33 treated with less quantities of the potash, the mean stay in hospital was 40·0 days.

Of the 25 treated without curative drugs the mean stay in hospital was 27·7 days.

If we exclude the last class, which is as yet imperfect for statistical purposes, as it does not include examples of all the four seasons, it would seem that, though smaller doses exert no effect, yet that full doses of the bicarbonate of potash have some influence in shortening the duration of the illness from the time of commencing the treatment to that of the patients being sufficiently convalescent to return to their usual occupations with safety.

I may remark here, that any other measure of the duration of the disease is quite untrustworthy for statistical purposes. The different degrees of susceptibility to pain exhibited by different patients, the desire of some to extenuate, of others to exaggerate their sufferings, makes it impossible to register truly even the exact day when the pain ceases. Whereas, in such a short period as it lasts after the commencement of treatment (namely, two or three days usually), the exact hour would require to be noted. It is equally impossible to measure when, or even whether, the swelling or redness is all gone. Those who have set clinical clerks to observe these facts know how little the case-books are to be relied on.

2. *Results of drugs on the consequences of the illness.*

In respect of their several preservative powers against the consequences of rheumatic fever—

Of the 26 *treated with nitre,* there were attacked with acute inflammation of the heart whilst under treatment (carefully excluding all those admitted with it already existing as a result of the current attack) 5, or 19·2 per cent. (4 cases of pericarditis, 1 endocarditis only); 4 have died—2 of inflammation of the heart, and 2 of sloughing back.

Of the 174 *treated with bicarbonate of potash,* there were attacked with inflammation of the heart, 9, or only 5·3 per cent.; none have died.

It would seem from this, at first sight, as if bicarbonate of potash had some preservative force. But the fact is, that nearly all of those treated by the alkaline method have been subjected also to what both rational physiology and the statistics following seem to show has a much more powerful influence than any other drug in keeping the heart free from inflammation. I refer to blanketing the patients.

3. *Effects of Blanketing.*

Up to May, 1855, no difference was made in the bedding of my patients with rheumatic fever from that of others in the ward; but after that date they were ordered to be rolled up in blankets, and no linen was let touch the skin. In nearly every case the orders were strictly obeyed.

Of 63, *either bedded in sheets, or who had wilfully thrown off their blankets,* 6 contracted newly pericarditis at least, if not endocarditis as well; 3 had relapses of pericarditis on old cardiac lesions; 1 had endocarditis alone; on the whole 10, or nearly 16 per cent., had inflammation of the heart, and 4 died.

Of 184 *in blankets,* none have contracted newly pericarditis; none have died; 1 had a relapse of pericarditis on old cardiac lesions; 5 had endocarditis alone; 1 a relapse of endocarditis on old cardiac lesion.

One of these included cases of pericarditis was brought on during convalescence by the patient being dowsed with cold water for an accidental hysteric fit.

Not 4 per cent. have had any acute affection of the heart; when it came it was of a milder character, and was generally to be accounted for by some imprudent exposure.

That is to say, that *bedding in blankets reduces from* 16 *to* 4, *or by a good three-quarters, the risk of inflammation of the heart run by patients in rheumatic fever, diminishes the intensity of the inflammation when it does occur, and diminishes still further the danger of death by that or any other lesion; and at the same time it does not protract the convalescence.*

LECTURE XIV.

GONORRHŒAL RHEUMATISM.

CASE.—*Name of disease not strictly correct—Its relation to pyæmia—May occur at any period of the gonorrhœa—Not a metastasis—Objection to any treatment grounded on its being a metastasis—Urethritis a worse disease than gonorrhœa—Possible peculiarity of gonorrhœal virus in these cases—Rarity of such severe cases as this shown by the results of seventeen other cases, which represent the more usual aspects of the disease—Specimen of a more usual case of gonorrhœal rheumatism, and its treatment—Recurrence of gonorrhœal rheumatism.*

(*Clinical, St. Mary's, May* 30*th,* 1863.

MRS. W—, aged twenty-six, exhibited on February 12th, symptoms resembling to my eyes those of a first attack of acute synovial rheumatism. She had been seized three days before with pains in the joints, and the right knee and left elbow were much swollen, and showed a slight erythematous blush of redness. There was headache and thirst; the pulse was 112, and the tongue white and furry. The case so strongly resembled one of rheumatic fever, and so little one of gonorrhœal rheumatism, and moreover the latter is so rare in the female sex, that I felt no hesitation about the diagnosis, and put her on the alkaline treatment for the disease I thought it was, with the addition of a few leeches to the affected joints. This went on till the third week in March, when the extreme obstinacy of the painful swelling, and its fixture in particular joints, induced me to make a more particular examination of the case with a view to a revision of my diagnosis. She then confessed the

following sad tale:—Three years previously she had been infected by her husband with syphilis, and bore a diseased dead child. Again she became pregnant, having in the meantime had secondary sore throat and a cutaneous eruption. The second child was born at seven months, and lived but a few hours. It also had an eruption on its body. She said she was again pregnant with a third, and was anxiously fearing for its life too, as she had then a purulent discharge contracted from her worthless husband. Curiously enough, he was stated by her to be also suffering from what she called "rheumatic gout," that is to say, a disorganizing inflammation of the joints, which had followed his gonorrhœa.* It was satisfactory to hear of the punishment of the guilty as well as of the innocent.

I then changed the treatment, leeched freely, and blistered the principal joints, applied constant poultices, and gave her iodide of potassium to the amount of thirty grains a day. In the chronic state which the complaint had assumed, the blisters (according to the patient's statement), gave more relief to the pain than leeches, and the result of this treatment was to reduce the size of the joints by the absorption of synovia, and to relieve the patient much. But I am sorry to say the right knee and left elbow appear to me too much disorganized for any likelihood of her ever entirely recovering the free use of them.

On May 26th, she was confined of a healthy child at the full term, so that it must have been begot at the end of September last year. At that time she is sure that her husband had no complaint of any kind, and that he did not have the gonorrhœal discharge I have spoken of till the middle of December. This accounts for the germ of the infant being healthy; and it is an encouraging circumstance to find the filtration (if I may so speak) of the mother's blood through the placenta purified it of the poison which began to work in her system afterwards, when her baby's ante-natal life was advanced to about four and a half months. It is valuable also to know that the thirty grains of

* I afterwards found this man in Middlesex Hospital, under the care of Dr. Stewart. This case was entered in the case-book as one of gonorrhœal rheumatism, and it seems he had had several previous attacks of the same nature.

iodide of potassium, which she took daily for ten weeks, and left off only when in labour, has no bad effect on utero-gestation and may be safely given to breeding women.

You have seen her to-day fulfilling the maternal duty of suckling her healthy infant.

During the last fortnight of pregnancy there was a singular firm elastic tumefaction in the vastus externus of the right thigh. It felt like very soft india-rubber, was painless, distinct, and as big as a large orange. What it was I do not know, and it has now disappeared almost entirely. I do not think it had any connection with those remarkable swellings in the muscles which we find in syphilitic patients, because these do not vanish so quickly, being much more permanent.

Before I proceed to comment upon the disease which has been the special object of treatment in this case, I would remark upon the healthiness of her present child. Such cases are a strong negative reply to a doctrine which is very popular as to the irremovability of the syphilitic virus. I mean the doctrine which maintains that when it has once gained a firm hold of the constitution, it is always transmitted to all future progeny. Here you have convincing evidence of the constitutional affection in the deaths of the two first fruits of the womb, and evidence of its eradication in the health of the third.

Gonorrhœal rheumatism is a convenient conventional term which we continue to employ really for want of a better. It means a specific acute or subacute inflammation of joints and the neighbouring white tissues, bearing in its external aspect a resemblance to sometimes one and sometimes another of the forms of the disease it is named after. But it has not the slightest other relation, either pathological or therapeutical, besides external similarity, to rheumatism.

It is really due to a poison absorbed into the blood from a mucous membrane affected with purulent gonorrhœa, and thus has more claim to be classed by the side of pyæmia than in the position where it is now placed. Like pyæmia too it has a strong tendency to disorganization of the affected part; pus and fibrin are formed, and the tissues are destroyed in bad cases. Like pyæmia too it does not exhaust itself by the inflammations which arise; it is not an acute disease in the sense of tending

to recovery, but a chronic disease getting worse and worse if not arrested. It is an accident of gonorrhœa, not an essential part of it, just as pyæmia is an accident of surgical operations on wounds.

Its extreme rarity in the female sex is an additional evidence in favour of the poison being absorbed from the locally diseased part. In woman the mucous membrane principally affected by gonorrhœa is the vaginal, a tough strong surface which bears a great deal of ill treatment without serious injury. Its diseases have but little influence on the general health. But the male urethra is a much more delicate part, and we can easily comprehend that it should oftener take up the gonorrhœal virus and communicate it to the rest of the body.

Being an accident it may occur at any period of the gonorrhœa, sometimes happening only a few days after the first commencement of the running; but by the simple doctrine of chances of course more likely in the longer period before the patient is free. Hence it often appears just as the urethra or vagina is getting well, and so has been reckoned an instance of metastasis. Metastasis however it is not, for often and often the discharge continues as bad as ever, or even grows worse, while the joints are swollen. And when the joints get better, there is no return or aggravation of the original ailment.

This is not merely a pathological question; for on the notion of metastasis it has been proposed to try and bring back the gonorrhœa to the genital organs by irritating injections. I have seen this actually done, but without any of the desired effect on the arthritic affection. Even if it were a curative operation I should be averse from practising it, for the disease which you thus give the patient is not true gonorrhœa, but urethritis or vaginitis, and that of a chronic character—a much worse thing. I say it is a much worse thing, because it is so dangerous, so very difficult of cure, not rarely indeed proving quite incurable. I published in the "Lancet" two years ago,* the case of a young man who died of inflammation of the bladder caused by the manipulations of a spermatorrhœist on his urethra, and I

* Viz., June 15, 1861, in a clinical lecture given at St. Mary's, but not republished in this volume, as it has no special bearing on therapeutics or on the Renewal of Life.

contrasted there the violence of the disease artificially produced with the mildness of a real specific gonorrhæa virulenta left to nature. A clergyman sometimes consults me about his general health who has had purulent urethritis for the last three years, for which he has been to several of the principal surgeons in London, and tried all sorts of local remedies without relief; so that he has now made up his mind to bear it with patience and try no more. It was first caused by a too zealous practitioner having passed a catheter to ascertain whether certain nervous urethric symptoms were due to stricture. It was at one time suggested that the catheter might have been an infected one, but the absence of any specific virus was proved by his wife not contracting gonorrhœa, though he had not foregone matrimonial intercourse. It is a simple urethritis, just such as we should cause by local irritants, and I think with such cases before my eyes I am quite justified in deeming urethritis a worse thing than gonorrhœa, and in declining to use it as a means of cure.

To return to the patient now under our observation. She will tell you that there has been nothing like a metastasis to other parts of her body; the purulent discharge continued quite unaffected by the swelling of the joints, and she says the same is true of her husband also.

It is a very singular thing that the gonorrhœa in both husband and wife should have been followed by the articular affection; it looks as if there was something special in the form of the original disease. But such an occurrence is quite exceptional, and may be a mere coincidence. Indeed, my only reason for mentioning it, is to warn you of its rarity, in order that you may not put it down in your pathological sketch of gonorrhœal rheumatism.

I must also warn you of the rarity of such severe consequences of gonorrhœal rheumatism as these which you see before you now. In the great majority of instances, especially if they are treated early and actively, complete recovery results. I have not had an opportunity of bringing such a case before my present class, because there has not been one under my care lately; so I will extract a few examples from my old case-books.

William M. (No. in Hospital Register, 2801), aged twenty-two, admitted November 26th, 1853, had pain in one hip, with swelling and redness of the feet and ankles. He got no better for treatment with nitre and warm-baths; and then it was found that he had a gonorrhœal discharge, and confessed that he had had a similar sort of rheumatism with gonorrhœa three years previously. He was cupped several times on the affected joints, and got well.

Thomas J. (No. in Reg. 4119), aged forty, admitted October 27th, 1854, had contracted gonorrhœa and got cold in a hay-field in August, and had had pains and swellings of the joints ever since. He had, on admission, swellings of the right wrist, and was helpless from pain in the knees, though those latter joints were not apparently enlarged. He got better in six days with warmth, nitre, and colchicum, and was dismissed.

James C. (No. in Reg. 4202), aged twenty-six, was admitted November 17th, 1854. Five years previously this man had contracted what he called "venereal disease," accompanied by an urethral discharge. Immediately afterwards his knees became swollen and painful, and had remained so ever since, in spite of blistering. On admission, the right knee measured in circumference 17 inches, the left 13½ inches. The right elbow was also enlarged and stiff. The jaw-joint had been similarly affected, and he could open his mouth but a very little way. The orifice of the urethra was red, and itched a good deal, but there was no gleet. Colchicum internally, and iodide of mercury ointment to the joints did him no good. He was then treated with leeches, iodide of potassium, and copaiba. The pains were relieved, and the circumference of the largest joint was reduced to 15½ inches by the second week in March. He had then been in the hospital more than four months, and, as he considered himself able to work, I dismissed him.

David O. (No. in Reg. 5117), aged thirty-eight, was admitted July 10th, 1855. After infection by gonorrhœa three weeks previously, pain and swelling of the left knee, and pain at the side of the head, had come on. There was a good deal of fluid in the synovial sac, and he thought it was increasing. The urethral discharge was irregular, sometimes absent, sometimes present. He was ordered, for about ten days, three

grains of calomel every night, and a senna and a jalap draught in the morning, and leeches were applied to the knee every other night for four times, and a weak chloride of zinc injection. The discharge and rheumatism ceased together, and he went out well in forty-five days.

James K. (No. in Reg. 7717), aged twenty-four, was admitted April 17th, 1857, with pain and swelling of several joints, accompanied by redness of one wrist. He was treated at first with alkalies as for acute rheumatism. Then sclerotitis was observed in one eye, and, on examination, he was found to have a purulent discharge from the urethra, which he had hitherto concealed. He was leeched round the eye and joints, and both got well at the same time that the urethra ceased to secrete pus. He was in the hospital thirty-three days.

William B. (No. in Reg. 8290), aged twenty-one, admitted August 21st, 1857, at Whitsuntide had become infected with gonorrhœa, which had continued ever since. At the beginning of July his ankles and one wrist got painful and swollen. They were not red on admission, though he stated that they had been so previously. For the first day he was treated with bicarbonate of potash, but, on the history being made out, it was left off. The treatment was changed, he was bled once and leeched twice, and took copaiba with some relief. Then he was packed for an hour a day in a wet sheet, but experienced no advantage at all from it. Then he took forty-five grains of iodide of potassium in decoction of bark daily, and went out cured on the 30th of October.

Frederick M. (No. in Reg. 497), aged twenty-six, a butcher, caught gonorrhœa in the beginning of July, 1858, and was an out-patient of this hospital for it, not having any bad symptom to require his admission. The discharge ceased, apparently in consequence of treatment, and, about the same time, he began to suffer from pain in the knees and ankles. They soon swelled, and, on his admission on August 19th, were slightly red. His feet and ankles were freely leeched, and he had senna every morning. As the pains relaxed, iodide of potassium was also given. He was discharged as cured in twenty-four days, but he was admitted again under Dr. Alderson in November, and received benefit from colchicum.

Cornelius W. (No. in Reg. 581), aged twenty-five, was admitted September 24th, 1858, with pains in the hands and feet, moving about in those affected parts, but not attacking the larger joints. The patient presented at first the appearance of slight subacute rheumatism, but, as it came out that he had gonorrhœa, he was treated with iodide of potassium, purgatives every morning and hot baths. He began to get better immediately, and left the hospital in ten days.

William M. (No. in Reg. 359), aged twenty-eight, admitted Midsummer-day, 1859, stated that three years previously he had suffered from gonorrhœa, which had been accompanied by severe pain and swelling of the knees. At the beggining of the current month he had again contracted the same complaint, and the knees and feet swelled and became painful. On admission there was still a running from the urethra, and the swollen ankles had a slight blush of redness. He was treated with leeches, purgatives, and iodide of potassium. He left the hospital nearly well in a fortnight.

Mary Ann M. (No. in Reg. 84), aged twenty-nine, was admitted Feb. 10, 1860, and treated as a case of subacute rheumatism. She went out disappointed of relief on the 16th of the next month. It appeared she had, a few weeks previous to admission, contracted gonorrhœa, and that very possibly was the cause of the obstinacy of her symptoms, especially as she was not treated accordingly. I extract the case mainly as a possible example of gonorrhœal rheumatism in the female, not leading to disorganization of the joints, as has happened to the patient, whose history began this lecture.

Henry P. (No. in Reg. 91), aged twenty-three, was admitted Feb. 10, 1860. Eighteen months previously a purulent urethral discharge (which had continued for nearly two years) ceased, and about the same time he began to be affected with pains in the knees and feet, which got so tender he could not stand upon them. The feet were thoroughly well leeched three times, he was purged and took iodide of potassium, and in three weeks was well enough to return to his work as a painter.

James B. (No. in Reg. 758), a smith, aged twenty-eight, had contracted gonorrhœa virulenta two years previously, but the purulent discharge frequently returned, and had never quite

ceased. He had, on admission, pain and a collection of synovia in the knee-joints, for which he had been from time to time under treatment during the last year and a half at his native place, Hastings, but without benefit. He was admitted into St. Mary's, Nov. 9th, 1860, was leeched three times, and had iodide of potassium so as completely to restore his health, at all events for the time, and left well Dec. 3rd.

Henry L. (No. in Reg. 34), a gardener, aged thirty-nine, was under my care for four months at the end of 1859, for what I considered and treated as chronic gout. On his readmission in January, 1861, he confessed to his former and present attack being consequent upon "a gleet." What he complained of principally was excessive heat and tenderness of the heels, soles, and toe-balls of both feet. They got red and swollen when he walked upon them, and quite prevented his following his occupation. He took iodide of potassium, was bled once, and was leeched twice on the feet. In about a fortnight he was freed from the ailment for which he came to the hospital, but unfornately some of the leech-bites suppurated and sloughed, and he had to take bark and remain in till the 15th of March. That, however, was not so long as he had been under treatment inappropriate to his disease on a previous occasion.

William B. (No. in Reg. 362), aged twenty-five, was admitted May 18th, 1861, with buboes in the groin, accompanied by a purulent urethral discharge of five weeks' duration. His knees and ankles had become swelled and painful, for which he came under my care. He was at first treated with alkalies for subacute rheumatism, and was reported better; but on getting up his pains immediately returned again, and he was put upon iodide of potassium, which quickly cured him. He left the hospital June 14th.

Henry P. (No. in Reg. 847), aged twenty-three, was admitted August 9th, 1861. Five years previously he had had gonorrhœa, which got well without any bad symptoms. A month before admission he was attacked with pains in the ankles, knees, hips, and right elbow. He then found he had a purulent inflammation of the urethra, with a scalding on making water. On examination the feet and knees were found swollen, and there were some superficial excoriations on the glans penis,

attributed by the patient to the collection of discharge, which the stiffness of his joints prevented him from cleaning away. (This seems to show the peculiar acrimony of the virus in these cases, for ordinary gonorrhœal pus does not excoriate the skin.) This patient had also gonorrhœal ophthalmia. He was leeched and took iodide of potassium, and went out well Sept. 6th. It may be remarked, in passing, that his leech-bites also inflamed, like Henry L.'s, but whether that is the fault of the leeches or of the patients, I cannot say.

John B. (No. in Reg. 66), admitted January 24th, 1862, had had a chronic purulent discharge from the urethra for a year, but had experienced no further inconvenience from it till January 20th, when he was taken with rigors and aching in all his limbs. Then his joints swelled. He was cupped, leeched, and purged, and had blisters applied to the knees, and took internally copaiba and cubebs. He went out well on the 21st of March.

(*Clinical, St. Mary's, November 14th*, 1863.)

James M., aged forty-six, a butler, caught gonorrhœa three months ago; and six weeks ago, as the urethral discharge was ceasing, pains commenced in the elbows, ankles, and knees. These pains were fixed, not metastatic, and grew worse and worse in spite of treatment. The left knee swelled more and more, and at his admission on November 7, there was a considerable accumulation of synovia in the joint. His general health was good, his appetite large; the bowels, pulse and skin were normal. I kept him in bed, starved him, leeched twice, and steadily fomented the enlarged knee, and gave him a scruple of iodide of potassium daily. Under this treatment for a week, the swelling has quite, and the pain nearly, disappeared from the knee; the other joints feel quite well. He cannot, however, straighten the leg, the tendons of the ham being impeded in their action by having contracted partial adhesions to the surrounding parts. I expect the slight pain that remains will be somewhat obstinate, and that we shall have to leech the knee a good many times before it disappears.* If the contraction

* He was leeched eleven times before he left the hospital for Christmas day, having found that nothing did so much good as that treatment. His leg was

remains after that, mechanical means to free the tendons may be employed.

I detail this case to you as a specimen of the more usual, or mild form of gonorrhœal rheumatism. If left alone and allowed to be ingrained into the constitution it becomes very obstinate of cure, and doubtless would have done so in this instance, unless the patient had been submitted to active treatment at this early stage. Now you see it is more manageable, but still by no means so easy of cure as ordinary rheumatism or gout.

As to the rationale of the treatment. The reason for its adoption is experience of its good effects, the little effect which other treatment has, and the certainty that the tendency of the disease is to get worse and worse if left alone. My conjectural explanation of its action is as follows: I suspect the cause of the disease to be a virus especially fatal to the vital functions of the white non-vascular tissues, which is carried to them from the urethra by the blood. The partial loss of vitality in these white tissues causes congestion and inflammation in the neighbouring capillaries* with pains and extra vascular accumulation of serum. The leeching and fomentations act upon the inflammation, and the iodide of potassium directly as a restorative to the white tissues; as to the starving, I do not know what to say—perhaps it does good by promoting absorption—perhaps it is not so requisite as we suppose.

(*Clinical, St. Mary's, February 6th,* 1864.)

The sequence of rheumatism after gonorrhœa seems to depend more upon the diathesis of the individual attacked than upon any peculiarity of the infecting virus: for, while some have the urethral part of the affection over and over again and suffer no further, there are others who never contract the slightest purulent discharge without the limbs being afterwards crippled. This is illustrated by a man who was admitted on the 2nd

not quite straight even then, and I cannot say that the last four leechings were of any use.

* See 'Lister on the early stages of inflammation.' Philosophical Transaction of Royal Society, Part II for 1858.

instant, Henry P., aged 27. He was under my care here in 1860 for gonorrhœal rheumatism, and went out in three weeks quite cured by leeches, poultices, rest, and iodide of potassium.* He seems to think himself exceptionally virtuous and lucky in having not again caught gonorrhœa till last August, and unlucky in its being followed in five weeks by painful swellings in his two ankles and one knee, which have continued to get worse. You heard me, in rebuking him for his nauseous vice of fornication, threaten him that each time he contracted gonorrhœa it would certainly be followed by this painful consequence; and I believe that I was not at all exaggerating, when I stated that possibly it might in the end cripple him for life, for I have seen instances of its really doing so. I shall this time put him under the same treatment as before, with probably the same result; but I felt strongly disposed to reject him as a patient, for having a second attack after he had once received such a warning of the consequences of vice. I think the threat of rejecting him will have an influence, for though he has been under medical treatment four months, he has got no better and feels the need of the leeching, poulticing, starving, and vigorous nursing which he will now receive.

* The case is catalogued in page 155 (No. in Reg. 91).

LECTURE XV.

PERICARDITIS.

Case of pericarditis coming on in the hospital—Rarity of this circumstance—Explanation of its occurrence in this instance—Diagnosis of old and recent disease by the physical signs—Practical value of diagnosis—Treatment—Leeches—Blisters—Poultices—Prevention better than cure—Case illustrative of the use of mercury in similar circumstances, and the reason why it is no longer employed by the author—Fatal case of pericarditis from exposure to the cold during convalescence from typh-fever—Two cases of pericarditis, one arising from a linen shirt-front next the skin during rheumatic fever, the other of doubtful origin—Action of opium on the pulse—Variations in the pulse—Remarks on the pain of pericarditis—Case illustrating its absence, and the non-reduction of the pulse by opium—Fatal pericarditis in a patient of choreic diathesis.

(*Clinical, St. Mary's, June* 21*st*, 1862.)

You may see an example of pericarditis which has come on in the hospital in a little girl named Fanny R—, admitted May 31st. She has always been delicate, she says, and looks younger than seventeen, which is entered as her age. She has never spat blood, but often has had cough, and for the last three months of 1860 was in the Consumption Hospital. Also eight years ago she went through rheumatic fever. On admission she said she had been then ill four days, and that she had been attacked with rigors and with pains and swellings in the knees and wrists at first. However nothing of the sort was to be found on examination; but dulness on percussion, with

ægophony and absence of breath sounds, showed the presence of pleuritic fluid, though there was but the slightest possible evidence of any acute inflammation of the serous membrane in the presence of stitch on inspiration. In spite of her being an intelligent girl, she seems peculiarly insensitive to pain. She was treated with a poultice first, and then a blister on the side, and "teacup" diet of beef-tea and milk. It was on the night of the 4th that the blister was put on. She was going on very well, improving in strength and in power of inspiration, till the morning of the 7th instant, when she complained of pains in the hands and wrists, which on inquiry were found swollen, as if from rheumatic inflammation.

She strongly denied having any pain in the cardiac region, even on firm pressure; so that, had I not been aware of her degree of insensibility to pain, I should have concluded at once that the heart was free from lesion. Fortunately I was cautious, and on listening with the stethoscope, a loud murmur was heard with the first sound of the heart, loudest indeed at the centre of the organ, but propagated over the upper part of the chest. Take warning from this, and do not omit to consider whether your patients feel like other people or not before you let your diagnosis be guided by their feelings.

With regard to this murmur, there arose a question of diagnosis, very important as regards treatment. Did it denote an old incurable injury derived from the former attack of rheumatism, or was it an acute state admitting of restoration? In the first place there was in favour of its being an old valvular murmur the fact of the previous rheumatism, and the peculiar liability of children, even more than adults, to have the heart affected: then there was its single character (pericardial murmurs being usually double) and the entire absence of pain. To weigh against the latter argument might be urged the already-named stoical character of the patient; and in favour of the recent nature of the injury there was stated the fact that nobody had heard it before, though the chest had been examined in reference to the lungs. But on the other hand, it should be remembered how very apt the ear is to let pass unheard even a loud sound when the attention is directed elsewhere. So you see there was an awkwardly even balance of arguments.

In this dilemma I found the advantage of what I can recommend to you as by far the best extant means of distinguishing single pericardial and valvular murmurs—sounds precisely the same in their effect on the ear, and occurring often at the same period of the cardiac movements, and therefore undistinguishable unless particular manipulation be used. The plan is—first fit the stethoscope firmly and steadily on the place where the murmur is loudest, and get impressed on the auditory nerve clearly the special character of the murmur—then, keeping the instrument still closely applied to the chest in the same position, remove your head very gradually, and try to gain a point at which you can hear the normal heart sounds without the murmur. If you *can* do this, the murmur is pericardial. If you cannot, but the murmur is heard as far off as the heart sounds, it is endocardial. In all cases where the disease is endocardial only, or pericardial only, the knowledge thus obtained may be safely acted upon.

I acted upon it in this instance, in spite of a preposession derived from the history and from the absence of pain, that it was an old valvular injury which gave rise to the symptom. In three days' time the conclusion was proved correct by the murmur becoming a double rubbing with the familiar characters of pericarditis.

I had enough faith in the test to order directly four leeches over the cardiac region, followed by a half-jacket poultice, and to attend to the more important serous membrane now inflamed instead of attending to the pleura. The patient was also put upon the usual treatment for rheumatic fever which I have detailed in previous lectures. After four days the double rubbing got shorter in duration and more limited in the extent over which it was heard, and then I ordered a small blister over the base of the heart. The rheumatic swelling had left the hands, so the alkaline treatment was then left off, but the poultice was continued.

I have related these details to impress upon you the plan to be pursued in rheumatic pericarditis from whatever cause it has been unhappily induced. Had the painful swelling of the hands in this poor broken-down child preceded by a sufficient interval the inflammation of the heart, we should have had a

timely warning, and possibly the useful careful treatment pursued by our nurses would have prevented the misfortune. But the occurrence of both at once, and the unlucky neighbourhood of the already diseased lung, combined to inflict upon us the sad sight of an irremedial mischief in process of formation. I say an irremedial mischief, because it cannot be doubted that this adherent pericardium will cause her to suffer from the evils of diseased heart in future years.

One part of the treatment which particularly wants remark is the application of blisters. At the beginning of acute serous inflammation they unquestionably do much harm. They increase its heat and violence, and all the more the nearer they are to the part affected. The action of the cantharides is to cause a fibrinous serum instead of a plain serum to be thrown out, which is a result decidedly to be deprecated at the beginning. But at a later stage, when pus is our chief dread and not fibrin, then the virtues of cantharides come to our aid. At this conjuncture apply your blister, and apply it as close as you can to the affected part; the healing process which follows its action on the healthy tissue spreads by continuity to the diseased tissue, and you feel yourself powerfully aiding the forces of life.

You should keep a poultice on the cardiac region during the whole time that pericarditis lasts. Nothing is of more importance in the treatment. Neither leeches nor blisters need stand in the way of its application; it is of at least equal importance to either of them in restorative action, and is suitable for all stages of the disease.

(*Clinical, St. Mary's, July 5th,* 1862.)

Fanny R., whose case I lectured about a fortnight ago, has got into a state to justify her discharge from the hospital in a few days. The pulmonary regions have become resonant on percussion, though some crackling (*râle de retour*) accompanies the air returning to the scarce restored tissues of the left lower lobe. The opposite sides of the pericardium may be adherent at some points, and the adhesions impede the contraction of the heart, I

much fear; for there is a soft initial murmur with the systole heard as far off as the first sound can be heard, caused probably by the valve not clenching completely and so allowing of regurgitation.

The pericardium can hardly help becoming adherent after its inflammation, and the moral I would draw from this case is to think the prevention of the injury, when threatened, a thousand-fold more important than its treatment, when established. I told you, six weeks ago, in a lecture on rheumatic fever, how this prevention is to be aimed at, and how it may generally be accomplished.*

I do not order mercury in acute pericarditis, and I will frankly tell you why, since it is right that I should make my practice useful to you as a warning as well as an encouragement. Ten years since a robust and excitable girl of sixteen had rheumatic fever; from her constitution I feared she was likely to have her heart affected, for young persons of a nervous temperament are much the most liable. I had then an impression that mercury would prevent the occurrence of inflammation in serous sacs. I put her under the influence of mercury—the pericarditis came on, and in its most virulent form—and the patient died in the height of it. This result made a deep impression on my memory; her fair young face always rises before me when the idea is mooted of preventing pericarditis with mercury, and I shrink from using it. Of course, to the reason a single case does not prove so much as statistics of many, and I do not cite this as sufficient evidence to your minds against the use of mercury. But it gained a powerful hold on my imagination, and if practitioners would be honest to themselves, they would often confess that some such feminine evidence as that above quoted governs a good deal of their practice. If I am illogical in my reason, at all events I will be manly enough to confess it.

(*Clinical, St. Mary's, February 20th,* 1863.)

I have an unfortunate occurrence to relate to-day. The poor girl, Elizabeth J., about whom I lectured to you three weeks

* See page 127.

ago,* and whom I described as then recovering from a short attack of typh-fever caught in the hospital during convalescence from acute rheumatism, has since died. She went on very well, and had began to eat meat and to be up and dressed on the outside of her bed, when she was exposed to severe cold from the ward windows being all opened during the frosty days we had last week. This brought on an attack of pericarditis on the 14th, of which she died on the 16th. I show you here the pericardium honeycombed over with fresh lymph. But I doubt if it was her first attack of pericarditis. On admission she stated that she had been previously subject to rheumatism, and during the attack for which she was admitted there was one day pain on pressure on the cardiac region, sufficient to make me order leeches to be applied, although there was no murmur. I think it is to some former attack probably that the firmer of the adhesions are due.

I mention this case mainly to warn you against exposing to the assaults of cold persons of rheumatic diathesis. All this injudicious ventilation which caused our patient's death was practised for the safety of others. Because she had typh-fever she was placed between two open windows, and continued to occupy the bed after all risk of infection had passed away. It was a sad misadventure, but you must not attribute her death to fever, or your statistical calculations will be erroneous.

(*Clinical, St. Mary's, January 9th,* 1864.)

You have visited with me to-day two examples of pericarditis, which are worth notice.

George D. is a pale spare man of unhealthy aspect, a carpenter, aged nineteen, who was admitted Dec. 22nd for rheumatic fever of nine days' duration, principally affecting the feet and knees. There was no bed for him except one close under a window, which, unfortunately, cannot be always kept shut. However, he was wrapped up close in blankets, and I dare say would have done very well, but for an important neglect of part of the usual treatment. You know I give strict orders that

* See page 113.

rheumatic fever patients are not to have any linen touch their skin. Well, on my visit to this man on the morrow of Christmas day, I found him with a pericarditis, of which I had made out the absence on his admission and on Christmas eve. And on putting aside the clothes for the purpose of auscultation, I found that the only covering to his bosom was cold, hard, damp linen. My rebuke to the ward-sister was met by the statement that she thought it was only a linen shirt that I objected to, and that the patient really had on one of calico. This I found to be true enough, but yet there was a linen front to it (for ornamental purposes), and the front unfortunately covers just the most important part of the body, the cardiac region. I am sure we may safely attribute the occurrence of pericarditis to this chilly decoration.

To avoid in future such an evasion of the standing orders for the treatment of rheumatism, I shall have a flannel waistcoat put next the skin of each patient so affected.

George D. has had his chest leeched and poulticed, and has taken opium freely, according to my usual practice, and the pericarditis has run through the course it usually takes when not very severe. First there was pain and a murmur only occasionally double, whose frictional character was made evident only by collateral evidence; then the murmur became faint and there was slightly increased dulness on percussion of the cardiac region, with pain still remaining, indicating an accumulation of fluid in the sac; then a freedom from pain, accompanied by a double friction sound, indicating the absorption of the fluid. To-day, the fifteenth after the first assault of the pericarditis, the murmur is single and scarcely to be heard, the sounds being very soft and feeble.

George D.'s strength had been much reduced by the rheumatic fever, prolonged as it was by the pericarditis, so that at the beginning of this week I found a slight sore from a superficial slough of the skin on the sacrum. Accordingly, I put him upon bark and ammonia, and augmented his diet to an extent unusual in rheumatic fever. To-day the sore is nearly healed, but the patient is so weak that he can scarcely turn in bed.

The other case is that of Ann B., a fresh-coloured, cherry-lipped girl, aged nineteen. When I came to admit patients

yesterday, I found her in the waiting-room, throwing herself back in the chair, breathless and gasping, and plucking with her hands at the fore part of her dress as if she would tear it open. She said she was choked by violent pain in the front of her chest, cried out and whimpered, and was so exaggerated altogether in her manner that I felt doubtful if it would not turn out to be a case of hysteria. Yet her aspect was not that of an hysterical person, so I sent her to bed; and being then able to examine the thorax, I found localized in the cardiac region excessive pain on pressure, and a distinct double friction sound. The breathing was very hurried, and the pulse 120, small and weak.

When more composed, the history she gave was this: she has never had rheumatic fever or any other serious illness; but for several winters past has had pain, of no great consequence, across the front of her chest. For the last three weeks she has felt unwell, but has not been laid up from work till the 6th instant. Then this pain commenced, got rapidly worse on the 7th, and on the 8th (yesterday), as I have said, she came here. She can assign no cause for her illness, nor can anything be elicited by cross-examination to account for it.

I ordered her a dozen leeches to the cardiac region, to be immediately followed up by a continuous linseed poultice, a grain and a half of opium every four hours, and "simple" diet.

At our visit to-day you saw a great change in the twenty-four hours. The patient had not been made sleepy by the opium, but had been calmed in a remarkable degree. A numerical reckoning of the amount of calm was afforded by the pulse, which had sunk from 120 to 56, was firmer and stronger. This effect of opium is very important in pericarditis, when quiet for the busy heart is so desirable and so difficult to procure. It is singular what a large quantity may be taken without hypnotism, or even constipation, in all serous inflammations. So that when time is of value, as in this case, you should begin with what cannot but be called, under ordinary circumstances, imprudently large doses, or you will not have mounted up to the efficient quantity early enough to be of use. I have increased the quantity now to a grain and a half every three hours.

Pressure on the cardiac region gives less pain to-day, and the

heart being quieter, the stethoscopic evidence of the disease is easier to make out. The to and fro friction sound is well marked.

The patient says that at present her chiefest pain is caused by breathing deep and by swallowing. The first she can of course shun, and I dare say will do so. The second is to a certain extent unavoidable, but we will do our best to relieve her by giving only liquid food, and in very small quantities at a time.

(*Clinical, St. Mary's, January 23rd,* 1864.)

Ann B,, about whose pericarditis I lectured to you lately, has interested us by the variations in her pulse. It continued slow till the 12th, when a visitor in the middle of the day appears to have engaged her in conversation too long, and it rose, so that by night it was 120. She continued to take the opium (gr. iss every third hour), and on the 18th it dropped to 96, on the 14th to 86, on the 15th to 80, on the 16th to 76, on the 20th to 72, and on the 23rd (to-day) it has risen again up to 88. This rise may be partly due to the patient's menstrual period, which has just commenced, making her sensitive and excitable, partly perhaps to a slight relapse of inflammatory action in the pericardium.

The pericardium has, on the whole, progressed favorably; the friction sound continued double till the 13th, when it was found to be single only. It got less loud, and on the 20th one could hardly say there was a friction at all, though with the first sound of the heart there was a peculiar harsh tone. However, to-day I can distinctly detect a friction sound.

The opium has agreed with her well. On the 16th it was increased to two grains every three hours, and it produced no abnormal sleepiness or constipation; nor has it prevented the return of her appetite, for on the 20th she was ordered a mutton chop, on her own statement of feeling very hungry. To-day, the 23rd, I have increased the dose of opium to gr. iij every three hours during the catamenia.

Of course we have been watching for any symptoms of rheumatic fever, and on the 16th I thought that a pain she felt

in one foot was an announcement of its approach; but that passed away quickly, and was accompanied by no redness or swelling.

I am anxious to draw your attention to the more than ordinary pain which this young woman has experienced from her pericarditis. At first it was excruciating, and even on the 20th, when the friction murmur had ceased, firm pressure of the cardiac region made her wince. I especially wish you to notice it, because there is a case of pericarditis which was admitted nearly at the same time, where there is a remarkable absence of this symptom.

John C., a journeyman butcher, aged twenty-four, was taken ill with rheumatic fever on the 10th instant. I saw him first on the 13th, when he complained energetically of the painfulness of the swollen joints, but disclaimed having any inconvenience in the chest; nor till I pressed my stethoscope on the cardiac region really hard, would he allow that it hurt him. Notwithstanding which, when I applied the ear I found a loud double friction sound. The sounds grew coarser, but shorter, up to yesterday, the 22nd, when I could no longer hear them, and conjectured that adhesion had taken place.

I cannot explain why there is pain in one case more than in another; it certainly does not denote severer disease, because in all other respects the man was the worst of the two patients. Perhaps it may have something to do with the absence of rheumatism, the pain of which withdraws the attention of the sensation to the joints, or wherever the swellings and redness may be.

Attacks of non-rheumatic pericarditis are more common in private practice than in hospitals. They usually arise from similar causes to those which cause pleurisy, namely, exposure of the part to sudden chills whilst its vitality is lowered by previous exertion. I had a case this week arising from walking out into the night air after exertion at a dinner party; and in boys foot-ball and boating are often to blame.

The treatment of John C. was the same as that of Ann B. He was twice leeched, and is still enveloped in a linseed poultice. On the 13th he was ordered gr. iss of opium every four hours; and on the 17th, as he was somewhat delirious, and the pulse

was 120, gr. ij every three hours. The delirium then ceased, but the pulse kept up. On the 20th, gr. iij every three hours. On the 22nd he said he was certainly more drowsy than usual, but the bowels were not made costive by the opium. The pulse kept up to 120. As he was entirely free from rheumatic pains, I ordered the quantity of the drug to be diminished to gr. ij every three hours, which he is continuing to take.

The extreme quickness and weakness of this man's pulse throughout has made me very anxious about him. The opium has seemed not to diminish it, as it did in Ann B., and that is the reason why I have pronounced him the worst of the two.

In John C. you have seen pericarditis in its most familiar aspect, that is to say, arising in the course of rheumatic fever, as a consequence of the exposure of the chest to cold, or the attempt at bodily exertion. In Ann B. there is no evidence of its connection at all with rheumatic fever. In the case I am going next to relate to you, there was no rheumatic fever present indeed when the pericardial inflammation came on, but there was a diathesis somewhat connected with the rheumatic, though in what way it is difficult to define.*

* * * * *

Alfred M. a delicate and thin boy of ten, was admitted December 18th ult. for chorea. He had had the same two years previously, and also at some periods, which he could not remember accurately, redness and swelling of the joints. On admission, he said his feet were painful, but I could see nothing like rheumatic swelling. There was a loud rumbling continuous murmur with the heart's action, which was violent and tumbling. This I attributed, I cannot say how correctly, to lesions produced by old disease. The cardiac symptoms were better after the lad had been quiet in bed a few days and had had a few leeches on. He was then treated with arsenic for the chorea, and got better, so as to be playing about the ward with some other boys up to the morning of the 20th of January. On that morning he told the nurse he had a severe pain in the front

* See the concluding part of Lecture XXIX, on Chorea.

of his chest, so she bade him lie in bed, and sent immediately for the house-surgeon, Mr. Coombs. He found a loud double friction sound in the cardiac region, and immediately leeched and poulticed it; but the lad got rapidly worse, and died in the evening of the same day.

You see here the heart and pericardium. The visceral portion of the serous membrane is partially covered with grains of soft lymph, in some places forming a reticulated coating: the parietal portion has a smaller quantity of the same lymph attached to it. Exposed parts of the serous membrane are (and were still more when first taken out) deeply stained with a purplish red congestion. The sac was filled with five or six ounces of transparent serum. And in the adjoining pleura of the left side there was a larger quantity of similar fluid; but as they flowed together in opening the chest, I could not apportion the property of the respective cavities. The opposite surfaces of the pleura were joined by some delicate threads of very soft lymph. The other viscera were normal in aspect.

The heart is large, weighing with the pericardium 10½ ounces. It has not been opened in the usual way, because I was anxious to show you the phenomena of pericarditis in its early period, the reddening of the membrane in the first stage of death, and the soft, almost creamy, coagula of lymph which produce friction sounds. But I can hardly doubt that there is old valvular lesion; and to the old lesions I attribute the remarkable rapidity with which the patient sank under what I suppose may be called an acute pericarditis, occurring without rheumatism to a rheumatic individual, and in a predisposed heart. The external motive cause I can only conjecture to be some secret escapade of the poor child's, which exposed him to cold and unauthorised exertion, and which he concealed from fear of a scolding.

[A few days afterwards John C. was able to get up, eat meat, and leave off opium. He was discharged cured on February 6th. Ann B. had the quantity of opium gradually diminished to gr. j night and morning, which to-day (February 10th) she says makes her sleepy, so it is omitted altogether. There is no murmur audible in the cardiac region, but the first sound is very long. She is up and dressed.]

LECTURE XVI.

PLEURISY.

First case, and its treatment—Cases of pure pleurisy not common in hospital practice—It is a slight disease, but capable of being made much more severe by bad management—Remarks on blisters and on local bloodletting—Their final intention restorative—Poultices—Continuous warmth as a renewer of life—Second case—Chronic effect of acute pleurisy—Treatment—Diuretics—Blisters—Third case—Pyæmic pleurisy, its fatality.

(*Clinical, St. Mary's, July 5th,* 1862.)

I AM glad to have an opportunity of bringing before you to-day an example of a disease so common in practice as to be one of serious import for you to study, but of which specimens do not very often occur in our hospital wards—pleurisy uncomplicated with further inflammation of the lung.

Thomas G., a day labourer, aged twenty-nine, was warded June 19th, with anasarca of legs and belly of a fortnight's duration, which he attributed to exposure to the weather. His urine was found to be albuminous. The house-surgeon gave him a hot-air bath, a jalap purge, and some draughts of nitric ether and digitalis. When I visited him next day (June 20th), he complained of sharp pain on both sides of the waist, which he said had been coming on for two days and was getting worse. On auscultation I heard pleuritic friction beneath both scapulæ and in the lateral regions; the normal respiratory murmur was still to be made out in spite of it; but there was a leathery creak, lasting through the whole of respiration

and the latter part of expiration. The tongue was furred, and there was thirst.

He was ordered to be cupped, but as the instruments had unluckily gone to be mended and would not be returned for an hour or two, a dozen leeches were applied along the lower edges of the ribs, in the infrascapular region. Immediately they came off a large poultice was placed all over the back of the chest.

The next day (June 21st) the pain and fever were quite gone, the friction sound was heard over a limited space, and on the 22nd had departed altogether. The poultice was continued one more day, as the patient remained in hospital to be treated for albuminuria.

Patients with pure fibrinous inflammation of the pleura, usually called pleurisy, without any affection of the pulmonary tissue, you have as yet probably not often had a chance of seeing. But you know from your postmortal experience in our mortuary how common it must be. There are few even of the most healthy chests in which you do not see old adhesions of the pleuritic surfaces, the relics of pleurisy, sometimes in one part, sometimes in another, sometimes partial, sometimes universal; they are so common, that they were supposed to be the normal condition of the parts when anatomy began first to be studied after the restoration of learning. What is the reason, then, that you have but few opportunities of learning how to treat this very common disease while you are pupils? Simply because it is scarcely ever so severe as to bring the patient into our hospital wards, and is fatal only by very rare exception; so that your only chance of observing it is when it is joined to some more alarming disorder. The man who is the occasion of these remarks would never have been admitted to St. Mary's had he not been taken dropsical at the same time as he caught his pleurisy.

Nine times out of ten pure pleurisy begins and ends with a catching pain in the side on inspiration, and a slight inflammatory fever, making the patient coddle at home and take slops, but not employ a doctor. It would be, perhaps, better for him if he did, for possibly his may be the hundredth or exceptional case, and his illness may turn out a more serious affair. Moreover, in every case, the pain in the side and the

fever may be shortened by good management and lengthened by bad.

For example—blisters at the outset of pleurisy invariably protract the duration of the inflammation and make it more severe. The property of cantharides is to cause and augment that very fibrinous crasis from which the membrane is already suffering. Exposure to cold and to changes of temperature, baths and the like, make it worse, as do strained postures of the body and exercise. Opiates cover up the evil with an anæsthetic mask, and prevent the patient knowing how he really is. Mercury is an unnecessary call upon the whole system to make destructive sacrifices for the sake of a very small and not highly important member. Purgatives do no good, and expose the patient to catch cold at the water-closet.

On the other hand, the treatment you saw applied gives decided and immediate relief, and prevents the danger of the disease continuing.

It is necessary to remark that the whole of it was not meant for the benefit of the pleura; the hot-air baths, the diaphoretic draughts, and the jalap were intended to rid the skin of anasarca, and were successful in so doing; while the treatment to which I design to call your attention as that specially appropriate to pleurisy is the application of the poultice and the leeches—the poultice always, and the leeches whenever the pain is decidedly "catching" or "stabbing" on inspiration.

I will speak of the last first, as it is most open to exception.

The object of leeching and all local bloodletting is to relieve inflammatory congestion, not only an evidence of loss of vital power in the local blood-vessels, but also the cause of further loss of vital power by leading to the other stages of the inflammatory state. The blood-vessels, from loss of elasticity, are unable to empty themselves naturally, so you roughly take the place of vital power and empty them artificially. You may perchance say, that is all very well in external inflammation, when you can draw off the blood which is causing the "*rubor*" and "*tumor*" visible to the naked eye; but you may doubt how the pleura, especially the pulmonary pleura, is to be affected by depleting the capillaries of the skin. Your recent experience in the dissecting-room reminds you that it is a very long way

round before you can find any vascular connection between the parts; you may think local bloodletting only beneficial by detracting so much blood, and that a small venæsection would be more convenient and equally effectual. Now it is not at all essential that there should be a vascular connection between separate parts for altered states and conditions of life to spread from one to another. I have seen in the dead body a round circumscribed spot of costal pleura affected with fibrinous inflammation, and this had spread, not laterally to the neighbouring surface of serous membrane, not to that tissue intimately one with it in vascular connection, but to the opposite surface on the lung, between which and its substance lay the great gulf of the pleural cavity—the great gulf, anatomically speaking, but not physiologically, as proved by this instance. If this gulf can be spanned by disease, the negation, the deficiency of life, shall it not be yet easier stepped across by the remedy, the renewer of life? I do not myself feel any hesitation in believing firmly what experience seems to teach, that in inflammations of serous sacs, depletion applied to the external surface has a power proportionate, not alone to the quantity of blood taken, but in an equal degree to the locality from which it is taken.

I have called the local drawing of blood a "renewer of life," and I think it is but fair to explain in what sense I so speak of it. The taking away the vital fluid is taking away part of the body, and so is directly a destructive agent. But then blood thus lost from an inflamed part is not all loss; a great deal of it is black, "melanosed," partially dead and unfitted for the purposes of life, and only a minority of its constituents can really be called living. Then again, granting that loss of blood is a direct loss to a living body, still the indirect gain is a full compensation in cases where it is rightly applied. The blood-vessels resume their elasticity, their current renews its force, and loss of substance is a regaining of function. So that a destructive becomes in the end a constructive remedy.

In the action of poultices there is no even seeming paradox to stumble at. Continuous steady warmth is the most direct agent in our hands of vital development. It not merely fosters vital growth, but makes that growth take a higher form of

life. Mr. Higginbottom found that different detachments of tadpoles kept in the dark and treated with different degrees of temperature, threw off their tails and branchiæ, and developed their lungs and became frogs, with a quickness exactly proportioned to the warmth they were subjected to.* Do not let any experiments on life escape you: turn to a practical use even that which seems at first glance most remote from practical use. Warmth, especially when kept steady and even by moisture joined with it, has the same effect on the failing functions of tissues in the higher animals as in the lower; it raises and restores the life to its normal force of development. If the milk is scanty in the breast of a suckling mother, a hot poultice or gentle friction with oil will revive its flow: if the liver ceases to make bile, hot fomentations will act as a cholagogue. As heat renews the vitality of the sluggish glands, so also it renews the injured membrane, which had been lowered to that condition we call congestion or inflammation, into the higher life of warm-blooded circulation. As it developed the tadpole into the frog, so it develops the half-killed diseased part into full life.

You must take care not to follow up the application of quickening warmth by the depressing influence of cold, or it becomes doubly depressing by contrast. Your poultice must be kept on hot and hot till all pain has gone and the breath can be drawn quite freely and easily. And it will do no harm to beguile your patient into retaining it even a little longer, as was done in the case which is now my text.

Such means will not fail to cut short an attack of pure pleurisy.

But you will say there are cases of pleurisy which are *not* cut short, and notably just now there is one a few beds off from the last patient, whose case I will extract from the case-book.

John C., a railway navvy, aged thirty-four, always enjoyed good health till six months ago, when, on the third day after

* 20 tadpoles placed in a dark cellar at—

56° produced in 89 days 10 frogs,
53° „ 103 „ 10 „
51° „ 131 „ 8 „

—*Proceedings of the Royal Society* (1862). Vol. xi, No. 48, p. 532.

lying in a damp bed, he was seized with a violent sudden pain on the right side which obliged him to take to his bed. He was there a fortnight, and was treated with mustard plasters. He coughed up a good deal of frothy sputa, and was a little delirious several nights. The pain then shifted from the right side and settled in the left, but did not prevent his getting to work again, a month after the first attack. His work has not been hard, as he reckons hardness, and he has kept at it, with a chance day's exception, till his arrival here on June 25th. The principal trouble he has had and the cause of his being off work sometimes, has been dyspnœa. He feels pain on bending forward and on drawing a deep breath.

On auscultation in a sitting posture, there is very absolute dulness of the lower half of the lateral and scapular, and of the whole infra-scapular region on the left side. The rest of the thorax is resonant. When he lies on his belly and puts the shoulders below the level of the chest, hanging his arms and head down, this infra-scapular region becomes more, but not quite, resonant, showing that the cause of the dulness is in part at least due to fluid which shifts about by the force of gravity. Still some dulness remains, and there is a whiffling sound with inspiration and expiration. And in the lateral region the dulness is unchanged by any posture.

The secret history appears to me to be this—that the man was seized with double pleurisy, worse on the right side than the left—that the treatment relieved it—but that the left side being the least cared for, the inflammation spread to the pulmonary tissue, and caused its insidious condensation. The cause of the dulness on percussion is partly fluid which is affected by gravitation, partly solidified lung which is not so altered in its position. The fluid in the pleura and the condensed pulmonary tissue have mutually kept one another from being restored to perfect life.

Such is the most ordinary cause of those exceptional cases of pleurisy which become chronic.

The longer they have lasted, the more obstinate usually are they in yielding. As respects treatment, you will find on the card the following, which may be considered the "*processus integer*," (as Sydenham calls it) of such cases :—

June 25th. *Empl. cantharidis* (6^2 *pollices*) *lateri.*

℞ *Misturæ potassæ nitratis* ℥*j*,
Tincturæ ferri sesquichloridi ♏*xv.*
ter die.

℞ *Pilulæ hydrargyri,*
Scillæ.
Pulveris digitalis, āā. gr. jss.
omni nocte et mane.

You will observe that the medicinal treatment is a union of destruction and construction; it is designed to alter, as far as possible, the whole habit of the system—to cause by destruction a demand for new material, the supply of which is guaranteed by the iron. The mercury causes a general increase of metamorphosis, the waste products of which are directed to the kidneys by the squill and nitre. The digitalis tends to relieve congestion by increasing the activity and tone of the blood-stream. So that by a union of virtues the combination prescribed in the pills will rarely fail to prove a powerful diuretic.

The blister which has been put on the side will probably have to be repeated once, and perhaps again. You will observe however that I shall leave a considerable interval of time between each blister. I shall not apply first one on the side, then one on the scalpula, then one beneath the collar-bone, stroke upon stroke, one on as fast as the other comes off. This is not an uncommon practice; and the object of it is to save time, by getting the two or three needful blisterings over as soon as possible. I do not myself adopt it: and I will tell you why; as the reasons give a very good example of the restorative system of medicine which it is my object to teach.

The action of vesicants is first to destroy the epidermis and to cause the exudation of a fibrinous serum beneath it. Very probably a similar but more remote effect is produced on the neighbouring tissue of the pleural sac. Nevertheless it is not at this stage of the process that the chief benefit accrues. If you watch carefully the line of dulness marking the upper margin of the collection of fluid in the chest, you will find that it falls—not when the blistered skin is full of liquid and is discharging serum—not when the counter-irritation may

be fairly concluded to be at its height—but after it is all over. As the sore heals, then the level goes down with the greatest quickness. That is to say, that the true use of blisters in such cases is to start a healing process, or a renewed life on the outside skin, in order that it may spread to the neighbouring viscus inside. As long as this influence continues to be exerted, you will gain no time by a recommencement of the process, and your too hurried repetition of blisters would add to the patient's distress, without conducing to his cure. Wait till the effect of one blister has quite gone off, before you order another.

Another case of pleurisy which has occurred this week, I do not cite as primarily instructive in a therapeutical point of view—for it was rather an instance of the weakness of our art—but as having a pathological interest.

Charles D., aged eight, was admitted on June 24th, with pyæmia after scarlet fever, affecting the principal joints, and with an incipient slough on the sacrum. On July 1st he died. At the request of the parents the curator cut into one only of the joints, and that was tense with creamy pus; so that the same condition may be assumed to have existed in all. On opening the chest, serum filled with flakes of fibrin gushed out from the right pleura. Bands of soft, elastic, straw-coloured fibrin of an inch in length united the opposite sides of the whole pleura, and coated the surfaces with a honey-combed layer. The lung, pressed back against the spine, was non-crepitant, inelastic, and tough. Now the front of this boy's chest had been examined on the day of his admission by myself, the house-surgeon, and clinical clerk, and I cannot but feel sure that had pleurisy existed at that period we should have found it out. Afterwards, the wailings of the poor child at the idea of being touched became so piteous, and the torture of moving the arms would probably have been so great, that an examination to discover the cause of the pain he complained of in the side was out of the question. The day, then, when the pleurisy came on is unknown, but it must have been less than a week before decease.

What an amount of disorganization to have happened in such

a short time! What a quantity of serum and fibrin to be formed! What a laying waste of the pulmonary tissue! Pyæmia is certainly the most destructive result of an idiopathic poisoning that we know; but yet, before seeing such a case as that of this child, we should scarcely believe the swiftness of its action to be so great.

The moral is, if the march of death be thus hasty, let there be no delay in your remedies. Apply your cupping, or leeching (or *faute de mieux* venesection), your bedding and your poultices, your slops and your diuretics, without losing a minute. Do not leave alone patients to nature in any disease; least of all in acute pleurisy, when really acute and dangerous. But I must warn you against looking upon this as a typical case. There was present in the body that frightful poison which produces the destruction of life we call pyæmia, and which would infallibly have proved fatal some other way had it not been so by pleurisy. The really typical cases are those which I described at the beginning of lecture as getting well by employment of the simplest restorative means, or even in spite of their neglect.

LECTURE XVII.

HYDROTHORAX.

Term "idiopathic hydrothorax" justified—Forms of pleuritic disease—Which form is here intended—Two cases—Hydrothorax, a collection of fluid in the pleura—Difference between collection and effusion—Source of the fluid—Action of physical agents in the production of the disease—Treatment founded upon the pathology—Blisters—Poultices—Mercury—Food—Digitalis—Squill—Nitre—Scoparium—Sequel of the second case, seven months afterwards—State of chest, and explanation thereof—Another case of displaced heart—Treatment by paracentesis—Large quantity drawn off without return of heart—Comparison of these two cases as to treatment—Results inferred from them, and from an analogous case of empyema, opening externally.

(*Clinical, St. Mary's, November 22nd,* 1861.)

Two cases of idiopathic hydrothorax in the wards shall supply us with instruction to-day.

Idiopathic "hydrothorax," or "hydropleurisy," is an expression which I find requires a defence. In the 'Cyclopædia of Practical Medicine,' and in the 'Library of Practical Medicine' (whose good indices render them the most frequent books of reference for busy men), the existence of such an idiopathic state is denied altogether. Effusions of fluid into the pleural sac are stated always to depend either on some visceral cause of dropsy, such as organic changes in the heart, liver, and kidneys, or to consist of pus, when the case acquires a title to be classed as empyema. An acute collection of serum in the pleural sac from causes depending on the pleura itself, is either

ignored altogether, or merged in the common description of "pleurisy." This I hold to be bad pathology, likely to lead to bad practice. That a quantity of fluid sufficient to fill one side of the chest to complete dulness, that is to say between four and five pints, should disappear in ten days or a fortnight, is surely conclusive against that fluid being pus. Pus is absorbed, if absorbed at all, with extreme slowness.

Then as to the undifferentiated classification of these cases as "pleurisy,"—is that practically correct? Let us examine. Half of our pleuritic patients have no fluid collected at all; there is pain in the side, and rubbing sounds on auscultation of the roughened surfaces, but no dulness on percussion. This is "*pleurisy pure,*" and gets well fast enough when treated as such. Then, again, there are very severe inflammations where the dulness is unfortunately due to pus. This is "*pleurisy with empyema,*" and requires the empyema to be treated as well as the pleurisy, if it is to be cured. Then there is a third class where all the general symptoms, such as pain on inspiration, fever, and so on, are accompanied by stethoscopic signs of a moderate collection of fluid, but whose rapid absorption shows it to be serum. This is "*pleurisy with serous effusion.*" But the serum is not a matter of importance; it causes no increase of dyspnœa beyond what is due to the pleurisy, and it disappears without any special treatment when the pleurisy is cured. The medical attendant is wise to think much about the pleurisy and little about the serum.

There is a fourth class, to two examples of which I call your attention to-day, where this condition is reversed, where the pleurisy is absent, or of small moment, and the amount of serum is great; and where the nomenclature, if it is to be of use, must indicate this. Here the practical physician feels that what he has to attend to is primarily the serum, and secondarily only (if at all) the pleurisy, and he requires a word to express this state of things. With Laennec, I would advise adherence to the name "idiopathic hydrothorax," meaning *a collection of serum in the pleural sac injurious to health from its quantity, and arising from an abnormal state of the pleura itself.*

Case 1.—Maria G., a housemaid aged twenty, has always enjoyed sufficiently good health to continue in domestic service,

though subject sometimes to "bilious headaches," to pain in the hepatic region, sties in the eye, and irregularities of the catamenia. She easily catches cold, and has habitually a dry cough, but never expectorated blood or indeed any sputa at all. Her father died at forty, of some chest complaint, but her mother is alive and well, and she has not lost any collateral relations in adult age. In short, though she is well grown and hearty looking, her constitution, perhaps inherited from the paternal side, is endowed with little power of resistance to external influences. She is just the sort of person who might through force of untoward circumstances develope tubercle; though I feel sure she has not done so as yet. I say she has not done so as yet, because such a constitution as hers gives way very rapidly when once disease has begun; and she is also very sensitive, so that she would be sure by this time to have shown it, did any internal organic lesion exist.

She was in her usual health up to October 27th last, and had menstruated naturally the week before. On that day and on the 28th, without any assignable cause, she felt "giddy, nervous, and ill;" and in the evening of the 28th she felt a difficulty in breathing, with a stabbing pain in the right side. The sharpness of the pain lasted three hours, when it went off, and was followed by what she describes as an "aching." On the 29th, she went to a neighbouring surgeon, who sounded her chest, gave her some pills and medicine, and bade her call again in a week. From that time up to her entry into the hospital she was unable to work; the dyspnœa kept on increasing, as did also a sensation of tightness round her waist; she lost her appetite, and was thirsty; she had also frequent shiverings during the week, but cannot fix the date of the first.

I saw her first on November 6th. She had to be propped up in bed from the orthopnœa and dyspnœa under which she laboured. There was complete dulness of the whole of the right side of the chest, except a small piece beneath the clavicle, which was resonant as compared with the lower part, but still dull as compared with the other side. In this part alone were there breath sounds to be heard; and these were of a bronchial character, like the noise produced by blowing in and out through a stethoscope. The pulse was small, 120. The tongue was

quite clean. She was ordered ℞ *Pilulæ hydrargyri, Scillæ, āā. gr. jss., Pulveris digitalis, gr. ij., in pilulâ ter die cum haustu sequenti*—℞ *Potassæ nitratis, gr. xx., Spiritûs ætheris nitrici,* ♏*xx., Mist. camphoræ,* ℥*j.; and a poultice was continuously applied to the right side of the chest. Diet: two pints of beef-tea, one pint of milk, bread ad libitum.*

Nov. 8th.—The breathing is more laboured; the dulness on percussion reaches higher; the pain has returned to the right side of the waist. *Applic. cuc. cruentæ ad* ℥*viij. lateri dextro; perstet in usu pilulæ et haustus ter die.*

Nov. 9th.—The sense of tightness and pain around waist are much relieved since the cupping. Otherwise there is no change in symptoms. *Add to diet another pint of milk.*

Nov. 10th.—The same report. *Emplastrum cantharidis lateri.*

Nov. 15th.—The gums feel, but do not look, sore. The breathing is decidedly easier, but I can remark no diminution in the extent of dulness on percussion. *Omitte pilulam in unam diem. Add to diet an egg and rice pudding.*

Nov. 16th.—There is a decided improvement in the breathing. She can lie down with the addition of only an ordinary pillow to the bolster. There is breathing of a mixed bronchial and vesicular character over the whole infra-clavicular and over part of the mammary region, and more resonance on percussion. No râles. *Resumat pilulam bis die.* ℞ *Decocti scoparii* ℥*jss. ter die, vice haustûs nitri prioris; repetatur empl. cantharidis.*

Nov. 18th.—Chest quite resonant in front. Beneath the scapula behind there is dulness on percussion, and ægophony. The gums not sore, but there is a mercurial taste in the mouth. *Perstet in usu pilulæ et haustus. Diet "simple,"—mutton chop, two pints of milk.*

Case 2.—Annie M., wife of a builder's clerk, aged twenty-seven, of a healthy long-lived family, has never been ill since the age of fifteen, when she had influenza for a fortnight. She has once borne twins, who died, but she has two living children, the last of whom was born May 23rd, and she suckled him up to October 14th, when she was forced to desist by her present illness. This illness she accounts for by the following history:—

During the first week of October her baby had an arm very

sore after vaccination; and she fed him from the left breast exclusively to avoid rubbing the tender place. To soothe the natural crossness of the infant she used to do this even out of doors, and once when so engaged under a tree in Kensington Gardens she felt much chilled.

During the second and third weeks of October dyspnœa gradually came on, accompanied by an uncomfortable feeling, by degrees amounting to pain, in the cardiac region, so that she told her husband she felt sure something was the matter with the heart. She positively denies having felt any stitch in breathing, or other pain in the side; she did not lose appetite, and did not experience any thirst, or other signs of fever. Her complaint was of dyspnœa, pain in the heart on exertion, and a dread that she was going into a consumption. This dread was increased by the coming on of a cough, accompanied by much expectoration of glairy matter.

She was admitted into St. Mary's Hospital on November 1st. On examination, the whole left side of the thorax was absolutely dull; it was nearly two inches by measurement larger than the right round the lower part of the waist, and there was entire absence of breath-sounds. The heart was dislocated from its usual place; the apex could not be distinctly found to impinge anywhere, but the general pulsation was felt partly in the epigastrium, partly behind the cartilages of the right ribs—not at all in the cardiac region. She could not breathe when lying down, and the inspirations were irregular, shallow, and frequent. On the right side there was excessive motion of the ribs and puerile breathing. The sputa consisted of transparent mucus with but little froth. The pulse was upwards of 120, sometimes irregular and intermittent. The appetite was natural; there was no thirst, and the tongue was clean.

The patient was ordered "half ordinary diet," a pint of beef-tea, and a pint of milk daily. A blister six inches square was put on the left side, and the following drugs prescribed:—
℞ *Pulv. digitalis, scillæ, pil. hydrargyri, āā. gr. jss.; omni nocte et manè.* ℞ *Potassæ nitratis, gr. xx.; Spiritus ætheris nitrici,* ♏*xx., Mist. camphoræ,* ℥*j. ter die.*

November 4th.—Her breathing is equally laborious. The sputa is more copious, and the cough increased, probably by a

draught from the window upon her bed. Pulse 100, weak. *No change in medicine. Blister repeated. Add an egg to diet.*

Nov. 9th.—The breathing is easier since last report, and the measurement of the thorax three quarters of an inch less. *Add a bottle of stout to diet.*

Nov. 11th.—She says she coughs only in the day-time, when there are windows and doors unavoidably open in the ward. She lies on the affected side without pain or inconvenience to the heart, though it still remains dislocated. *Diet "simple," with one chop, one egg, one bottle of stout.*

Nov. 14th.—Soft and distant breath-sounds with inspiration and expiration under left clavicle.

Nov. 15th to 18th.—The medicine was omitted and effervescing draughts with prussic acid were given on account of nausea and vomiting, which did not come on after eating, but occurred the first thing in the morning, when the stomach is empty.

Nov. 18th.—She resumed the medicine before prescribed.

Nov. 20th.—There is very little, if any, diminution of dulness on percussion since admission, although air now enters the upper lobe. The fluid does not seem to have been continued to be absorbed since the 14th. Perhaps this non-diminution of dulness arises from the partial return of the heart to its place; for the organ can now be felt pulsating behind the cartilages of the left ribs as well as on the wrong side of the chest. Pulse 100, of good power. The stout caused her face to flush after dinner, so it is left off. Other diet as before. ℞ *Pil. hydrargyri, gx. iij.; Scillæ, Pulv. digitalis, āā. j¼., ter die; Potassæ nitratis, gr. xx.; Spiritûs ætheris nitrici, ℥xx.; Misturæ camphoræ, ℥j. ter die: repetatur emplastrum cantharidis.*

In the first of the cases I have narrated (that of Maria G.) there is every reason to believe that the abnormal state of the pleura was of an inflammatory character. The pain in the side, the stitch on inspiration, the rigor, the loss of appetite and feverishness, all support the opinion that there was inflammation of the serous membrane. And probably there was fibrinous exudation too, as there usually is in even slight pleurisy. But this attack seemed to have been of a very unimportant character in itself; she was not confined to bed, and the excellent

practitioner whom she consulted in the first instance "gave her some physic and pills, and told her to call again in a week," so little did he think of it after examination of the chest. It was of an unimportant character in itself, but it led to results which might have been very serious, perhaps fatal.

In the second case there is nothing that you can set down as evidence of pleuritis. The patient is of a nervously sensitive temperament, very susceptible of physical or moral pain and pleasure, so that had there been anything disagreeable to feel she is not likely to have forgotten it; yet she most positively avers that there never has been since she was taken ill any stitch in the side or catching of the breath in inspiration; the only pain in the chest at all being that arising from the forcible dislocation of the heart, and closely connected with its struggling palpitations. There was no rigor, no thirst, furred tongue, or loss of appetite, such as accompanies pyrexia. Yet the hydrothorax is greater in extent, and is rather more obstinate against remedies than in the former instance.

We have, then, got so far on with the pathology of idiopathic hydrothorax as to be able to say that—1st. It does not follow severe pleurisy,—for that produces pus and fibrin in quantity proportioned to its intensity, and not serum:—

2nd. It sometimes follows slight pleurisy, as probably here:—

3rd. The pleurisy is sometimes so slight, that it may come under the rule *de non apparentibus*.

Yet that the cause of the hydrothorax is the pleura itself, we can hardly doubt when we find all the other viscera painless, apparently normal, and doing their duties in the usual manner. Moreover, it is absorption, a function of the pleura, the want of which truly constitutes the disease. You must not let the commonly used but deceptive word "effusion," mislead you into viewing dropsical fluids as products of extra exertion on the part of the sacs which contain them. Like all morbid phenomena, dropsical fluids are proofs of sluggishness, of deficient vitality. In full vigour of health, the pleura, pericardium, and other similar membranes probably pour out a much greater quantity of fluid than they do in disease: this fluid, in the normal state, is taken up again by absorption as soon as exhaled, so that on opening the serous sacs we find them damp, indeed, and dripping, but

empty. By disease absorption is stopped or at least slackened, and the natural transudation still continuing, a collection of its products remains ensacked. Think of dropsy as a *collection*, not as an *effusion*, and your pathology will be right.

Do you ever, while looking in a dead body at these thin apparently unimportant membranes—seemingly only the sacs as they are called—do you ever reflect on the business they transact when they are alive? The experimental observations of physiologists tend to assign to them an activity almost incredible, and pathologists will do well not to neglect the hint. Professor Lehmann * opened the pericardium of a healthy criminal, and collected the fluid which ran from it in three minutes and a half. It amounted to 33·8 grammes (9½ fluid drachms). If always exhaled at that pace, the quantity in twenty-four hours would be a gallon and a half from the pericardium alone!—equal to about one-sixth of the whole weight of an average man. This in a state of nature would be immediately re-absorbed; and lest we might hesitate to credit the serous membranes with such an enormous power of endosmosis as well as exosmosis, we can refer to Dr. Richardson's † experiments, which exhibit this power in action. This physiologist injected into the peritoneum of a dog weighing 23 lbs. water to the extent of 4lbs., or more than one-sixth of its weight. Twelve hours afterwards the animal gradually sank, and was examined an hour after death. Not a trace of fluid was found in the peritoneum. It had all got into the veins, and caused death by dilution of the blood. Three repetitions of the same experiment produced results essentially the same, the injection of a quantity of water equal, or nearly equal, to one-fifth of the weight proving fatal by artificial anæmia—not by retention of the fluid in the serous sac, but by its being taken into the circulation. When a less quantity is injected, the animal recovers in about three days; but even in the fatal cases, the serous membrane does its duty in taking up with an almost incredible activity the water presented to it.

When you reflect upon the activity of the serous membranes in a normal state, you will have no difficulty in understanding where the great mass of fluid comes from in dropsies of the serous

* Lehmann's 'Physiol. Chemie,' ii, 309.

† Dr. Richardson on the 'Coagulation of the Blood,' Exps. 36, 37, 38, 39.

sacs. Nor will you fail to see whither it ought to go. And then you will clearly see that the disease to be treated is no excess of life, no exaggerated transudation, but a defect of life, an arrested absorption.

How do the physical agents to which illness is traceable beget the varieties of pleural disease which I have noticed? When by the impression of cold, or by direct mechanical injury, an inflammation of the pleura is produced, with great congestion of the veins at first, and afterwards with a copious formation of fibrin, the absorption indeed is interfered with most forcibly; but yet it is not these severe pleurisies in which you have the largest collection of fluid. The reason of which is that the normal exhalation is then slackened at the same time. But it is arrested by a less severe impression than the absorption is; and either only a local obstruction of the absorbents may take place by a local formation of fibrin or by congestion, or a partial arrest of it throughout the whole area by a force unequal to the production of actual inflammation. In each case, the exudation remaining nearly normal quickly causes a copious collection of fluid. The reason why hydrothorax is not more common, is, that usually the arrest of the exudation is contemporaneous with, and in proportion to, that of the absorption.

On this pathology is founded the treatment. The aim is to restore the function of absorption, and to that end our remedies are directed. I will remark upon them severally.

Blisters.—I will not insult pupils who have gone through a course of physiology by supposing that they would do anything but smile at the vulgar idea that blisters do good by "drawing" to the outside the fluid from the inside; for it must be obvious to the most superficial medical student, that the quantity thus elicited is too small to be of any service. But still perhaps you may not have clear notions as to their real action; and therefore there is danger of your sometimes applying them wrongly. The true profit to be got out of cantharides is, in the first instance, the encouragement of absorption, a power which is exerted over fluids and solids equally, and therefore is quite independent of the evacuation of serum by the cutis. The explanation of the steps in this process most reconcilable to physiology, are the attraction of blood towards the capillaries of the

skin in the first place; secondly, its dispersion, and the consequent quickening of the capillary circulation in the neighbouring parts. With the quickened capillary circulation follows increased endosmosis, according to the well-known law, that the attraction of fluids through membranes is in the direction of the fluid set in motion and proportioned to the rapidity of the motion. A further advantage is derived from the renewal of growth which is entailed on the tissues by the self-renewing skin. The process seems to be propagated to surrounding parts notwithstanding dissimilarity of tissue.

The practical knowledge to be derived from this physiological view of the action of a blister should teach you patience in waiting for the advantages to be derived from it; for they are obviously by no means limited to the period of its application, but rather begin after it is removed, and continue even after the sore place is healed. You may also learn by this view of its action not to torture your patients needlessly by keeping the blister on too long, under the mistaken idea that you cannot have too much of a good thing.

In some cases I do not even allow the blister time to raise the scarf-skin, so that I may have an opportunity of repeating it in the same place. But as a general rule I think the detachment of the epidermis desirable, for it appears to me that absorption is particularly active during the growth of the new skin. Perhaps the capillary circulation is quickened by the demand for new material entailed by new growth, and perhaps the industry of increased life may spread to the neighbouring absorbents and solid tissues. Whatever the explanation may be, the fact is that during the healing of a blistered surface its chief benefits are to be found.

Next in power to blisters come *poultices*. Their action in a great measure depends on the continued moist warmth acting on di-osmotic processes according to the law of their augmentation by heat. But it is also partly in a more special manner vital; for the skin is reddened, swelled, and made more delicately sensitive by their application. They are useful in pleurisies and moderate collections of fluid, when their size needs to be moderate only; but it is inconvenient to keep the whole side covered

up with a poultice, and if they are not constantly put on hot and hot, the surface is apt to get chilled.

Mercury distances all the contents of our pharmacopœia in the power of hastening destructive metamorphosis. Under its influence all the excretions are increased at the expense of the tissues. It is quite true that by such a process nothing is directly gained in cases like those before us; there is no poison to evacuate, and the debility which follows is so much ground lost. Harm certainly is done by it, but with the harm is joined a good which I think is worth the loss. No drug so consistently and steadily aids absorption as mercury, and nowhere can you trace its effects so easily as in hydrothorax. In the history of both these cases you may observe that no immediate improvement follows the ingestion of the remedy; but that immediately on its pathogenetic effects being produced, immediately on the gums becoming tender, the dispersion of the fluid can be tested by relief to the breathing and commencing resonance on percussion. And from this point a steadily advancing progress is made to recovery.

I would wish you to remark that the relief to the dyspnœa has preceded by a short time the return of resonance, especially in the woman whose hydrothorax is on the left side. The reason is that when a certain quantity of fluid is removed, the emptied space is filled up in both instances by the re-expanding lung, and in the left side by the return also of the dislocated heart. It is necessary to note this in order to trace correctly the period when the remedy begins to work.

When absorption is once set a-going, it is not necessary to continue the full doses of mercury; if any evil accrues from it, you may leave it off altogether; for its beneficial effects, like those of blisters, may be calculated upon as likely to continue after its intermission.

And you may also avoid the injury liable to accrue from the destructive drug by amply supplying the materials to take the place of the loss. Be very careful that your patient has food in the most frequent doses possible, in the largest doses that will not give nausea, and in the forms most easily digested. You have seen this aimed at in the dietaries of the cases under your notice, on principles which I need not again recount.

Digitalis, squill, and nitre were ordered for their diuretic

qualities only. That they all, both separately, and combined, increase the quantity of the urine, is established by observation; and that such action is beneficial in dropsies, is a traditional belief. For my part I have no reason to doubt it, for I remember as a student to have seen patients recover in whose treatment the diuresis was the only therapeutic agent that I could at all reconcile with rational physiology. Diuretics do not promote absorption in the same manner as mercury, by the hastening of destructive metamorphosis. The experiments collected by Dr. Parkes* show that though the water of the urine is augmented, yet that the daily excretion of urea is either diminished or unaffected, thus proving that at least one great class of the constituents of the body, namely, the nitrogenous, are exempted. This consideration has an important bearing on practical medicine, for it allows us freely to administer these reagents combined with mercury, without fearing that we shall thereby add to the unavoidable evils of that mineral.

Scoparium.—The most memorable example to my own mind of the good effects of broom-tops, is that of a case in which I differed in opinion with a patient, and in which he was right while I was wrong. A poor fellow with slowly growing malignant disease of liver and peritoneum was taking under my orders this remedy for the ascites caused by the abdominal tumours. It still increased, and pressed upwards the diaphragm so much that I wished the peritoneum to be tapped. He flatly refused, and so of course ceased to be patient of mine. About six months afterwards he came to me again with an extension of cancer to the costal periosteum, of which he shortly afterwards died. To my surprise I saw his ascites was all gone, and inquired who had cured it. He stated that he had continued the use of broom-tea for two months after his dismissal from my care, and that during that time his abdomen was reduced to its natural size, and had not again swelled. Surely a course of treatment under which dropsy due to increasing malignant tumours has got well, must have no ordinary power.

Besides acting as a diuretic, broom has the additional advantage of giving an appetite by the bitter which it contains.

* 'Parkes on Urine,' pp. 158, 170, 173.

(*Clinical, St. Mary's, June* 21*st*, 1862.)

During my visit a few days back a young married woman was in the ward,—Annie M., about whom I gave a clinical lecture on hydrothorax at the end of last November. You may remember that then her chest was filled with fluid and the heart pushed over to the right side. She did not come for advice, but to thank me and show her chest, which I was curious to know the state of. We found that the heart had returned wholly to its natural site, and that there was to be heard vesicular breathing, mixed with a few occasional crackles, throughout the pulmonary tissue. The lung has expanded, lets in air, and does its work. It has expanded, but it has not expanded to its full size, nor does it let in all the air it ought. For on percussion the part below the clavicle is still dull, and is flatter than the opposite side, and the left ribs do not open out with inspiration so well as the others. I have no doubt that from long compression the lung tissue has partially degenerated, and that it will be months, perhaps years, before it recovers its full life. Her occupation of nursing a sick husband is not the most favourable one for regaining vitality, but still you see her in as fair a way to do so as can be expected under the circumstances.

Over and above the possible degeneration of the tissue, there may be another cause for the dulness on percussion. I pointed out to your notice in the wards a week or two ago a vessel of serous fluid, which had been drawn off by paracentesis from the thorax of a patient of Dr. Sibson's. It was transparent, straw-coloured, and not perceptibly reddened by blood. In the centre of the porringer floated a delicate fibrinous clot, just such as forms in blood, but wanting the red globules. It was coagulable fibrin that had coagulated after being drawn off. Now if this fibrin should collect and be coagulated inside the pleural sac, it clothes the lung with a strong coat which impedes its expansion; and if it form also a layer over the costal pleura, each fibrinous mass would separately produce partial dulness on percussion, without the pulmonary tissue being seriously the worse for it.

I am glad Annie M. came to show herself just now, as you have under your eyes a case very similar to hers, where a somewhat different treatment has been pursued.

James S., a tall and muscular day-labourer, aged twenty-six, was admitted May 30th, 1862. For nearly a year he had found his breath short, but was not so seriously hampered by it as to be obliged to give up work, till last Christmas. Shortly before that date he says he remembers observing that his heart beat on the right side of the chest instead of the left. That symptom was certainly very conspicuous on his admission; you could not hear or feel a trace of heart-strokes except on the right of the median line, and there they were very strong and loud. So one can easily conceive its having been remarked even by an unprofessional person. There was an entire absence of breath-sounds on the left side, which also was absolutely dull on percussion. Several careful examinations on successive days by different parties made sure of the fact that the left side was not in the least dilated, eighteen inches from median line to spinous process being the exact measure of the semi-circumference of the thorax on left and right.

He is a hearty strong man with the exception of dyspnœa, and appears to have no other disease about him beyond that of the pleura.

He was at first treated with the diuretic pill (*Pil. hydrargyri, pulv. digitalis, scillæ, āā. gr. jss*) every night and morning, a draught containing nitre and iodide of potassium three times a day, and a large blister to the side. But after a week of this treatment no ground seemed gained, no respiration was to be heard in any part of the left lung, and the heart seemed if anything rather more over to the right side than before. He himself thought that the dyspnœa was increased. I therefore tapped the chest with a small trochar between the fifth and sixth ribs in the lateral region, and drew off sixteen fluid ounces of fluid, and then continued the same treatment as before, to try and encourage absorption.

The fluid drawn was a yellow serum slightly opalescent. After standing, it deposited some of the grey opaque matter which caused its opalescence. The opaque matter examined under the microscope was seen to consist of fine granules, irregularly conglomerated into globules of various sizes. The application to it of acetic acid did not exhibit the presence in those globules of any nucleus, but rather dissolved them, and

rendered them still less like pus than they were previous to its application.

My own impression is, that the granular matter is fibrin altered by long soaking in serum—the same fibrin in fact which I showed you, showing signs of recent life by coagulating into a clot, in the fluid drawn from Dr. Sibson's recent case; but which has become by time dead and unable any longer to coagulate. It is the fibrin which is exhibited in ordinary blood-serum, and, after exuding through the coats of the vessels, is still found in the more watery serum of serous sacs.

On the day of the operation there was some bronchial breathing to be heard beneath the left scapula, but the dulness of the left chest on percussion, and the dislocation of the heart were unaffected.

Two days after that I could not hear even the bronchial breathing, and the patient seemed in no better case than on admission.

Four days after the first tapping he was tapped again to the extent of eighty-eight fluid ounces. After this, breath-sounds were to be heard very distinctly in the lower lobe, but not in the upper.

On the 18th of June the diuretics were left off, and the following prescription was ordered :—

℞ *Quinæ et ferri citratis gr. v cum olei morrhuæ* ʒij. *ter die.*

Though the diuretics seemed to be doing no positive harm, yet I thought it possible that tonics would do him positive good, and ordered them as above described.

He was allowed to have full meat diet, and also to get up and walk about; for I have noticed that absorption will often take place quicker when the patients are in the erect posture than when they are confined to bed.

(*Case continued in a subsequent lecture, July* 19*th*, 1862.)

One would have thought that enough liquid had been drawn from James S. to allow the heart to return to its place. But it was not so. On the 6th of July, five weeks after admission, he was punctured again and fluid let out to the amount of forty-four fluid ounces. He has also had the chest painted with iodine to encourage absorption. But the heart has not come back.

This advantage only is gained, that the pulmonary tissue has been gradually returning to its allegiance; there is very fair breathing beneath the scapula and some in the lateral and in the supramammary regions.

You may have remarked that the lung remained dull after each tapping, although the breath-sounds increased. This I conceive to be due to a layer on the pleura of that fibrin which I have pointed out to you as a natural constituent of the serum in both the recent and more chronic forms of hydrothorax. I believe the abnormal coating binds down the lung, preventing its expansion, and counteracting the remedial action of the operation. So that much less than you might have expected has been gained by it, and the patient remains on hand as long as the young woman, Annie M., whom I showed you in the ward and lectured about a month ago, and who was not tapped. In fact, the chest refuses to be hurried by violence and must take its own time.

I say this not to discourage you from practising the operation of paracentesis; for it is an easy, safe operation, and in recent cases very effective; but simply to prevent your disappointment in case you should anticipate too immediate benefit therefrom in chronic collections of fluids.

As an experiment upon the heart, I have had James S.'s chest bound up with a stout tight bandage, as if the ribs were fractured. The design is to make the bony parietes of the thorax a fixed point, so that the healthy right lung may compress the heart by its expansion; and as it moves more than the left imperfect lung by reason of its healthiness, it may possibly assist in reinstating the displaced organ. All I can report upon the experiment as yet is that it seems to do no harm, but I cannot say it does any good.

The patient also continues his tonic treatment, and I think that each time I listen the breathing in the lower lobe is more distinct. The upper lobe expands much more slowly. I suppose the diaphragm has not the same power over it to draw the air in, and so we find only an indistinct distant breathing in that part.

You will probably ask what is likely to be the result of this case. In answer I refer to that of Annie M., which was one

exactly similar.* And I may refer also to another, not indeed of hydrothorax, but of a disease whose mechanical relations to the chest are closely analogous, empyema thoracis.

An old patient of mine, formerly a horse-jockey, aged now fifty-four, is occasionally to be seen about the streets near here, whose chest presents a striking instance of the form which contracted ribs assume. It is a case not indeed of hydrothorax, but of empyema after pleurisy, which occurred in this hospital in 1857, and is reported by the then house-surgeon, Mr. Ash, in the 'Lancet' for May 31st, 1862. The empyema was cured in the only mode in which it can be cured, namely, by the external discharge of the pus. Thus the chest was put into the same relative mechanical condition as is that of the patient now in the wards upon whom I am lecturing. The heart, which had been displaced to the right side for two months, returned to its place in about a month. After that the ribs fell in, and became flattened very gradually, so that they did not attain their utmost flattening till the autumn of 1859, two years after the empyema. And then how were they flattened?—not in the part where the empyema had been, and whence it had been discharged—not in the lower part of the thorax—but beneath the clavicle, which is so depressed that the man looks quite lopsided as he walks.

I fully expect the ribs of our present patient will fall in after the same fashion, and that his heart will in due course of time get back to the right place, but that as the displacement has lasted longer, so that the restoration will be longer about.

It may be remarked farther, that in the lop-sided old jockey the ribs, though flattened, move freely and equally on both sides with the breathing, and that the air enters the two lobes of the lung on the formerly affected side fully and equally. This is a cheering observation; it encourages us to prophesy that our present patient also will with time recover the full use of his lungs.

* Shortly afterwards this man, James S., returned to work at his own request. I did not dissuade him, as he was able to run up stairs without dyspnœa, and felt sure he would be able to earn a fair day's wages. The heart however remained beating on the right side. I have not heard of him since then. October, 1863.

LECTURE XVIII.

ACUTE LARYNGITIS.

Case related—Important point in the pathology of the disease is its locality—Tracheotomy must not be represented as a last hope—Reasons for delaying it and reasons for not delaying it—Care of digestive organs—Wine—Solid food—Antimony—Mercury—Laryngitis, acute and chronic—Difference in pathology and in principles of treatment.

(*Clinical, St. Mary's, October 25th,* 1861.)

Maria F., aged twenty-two, a domestic servant, was placed under my care a fortnight ago. It appeared that she came first as an out-patient, with a catarrhal cold of head and chest of a few days' duration. But she found so much difficulty in breathing that on the second day of her attendance she could not leave the hospital, and was sent up to bed. She was, when first seen (on October 12th) cold and shivering, her face was livid, her pulse weak, her breathing laboured, noisy, and spasmodically irregular. There was also slight fulness of the throat and tenderness on pressing the upper part of the larynx. She was ordered inhalations of hot steam, and frequent teaspoonfuls of hot beef-tea and wine; four leeches were applied to the trachea, and a draught of an ounce of decoction of cinchona, and a drachm of compound tincture of cinchona, ordered to be taken every alternate hour.

Next day, October 13th, it is reported in the clinical case-book of Mr. Young, the house-surgeon:—

"She passed a very bad night. The dyspnœa is increasing; but she was able to swallow till 11 A.M., with difficulty. The throat is more tender. She is obliged to be propped up in bed,

as she could not breathe in any other position. There is slight cough, the face is flushed, the lips lived, the eyes swollen, and countenance anxious. These symptoms gradually increased till 7.30 P.M., when she was found gasping for breath, and asphyxia was fast coming on, when a little chloroform was administered, and Mr. Young performed tracheotomy. After the operation, the pulse was 100; she was able to swallow, and expressed herself greatly relieved.

"Oct. 14.—She could not sleep very well. She took a little nourishment. The breathing was tranquil. She was ordered to have an enema of mutton-broth, with ten minims of laudanum every three hours; and also as much nourishment as she could take by the mouth.

"Oct. 15.—She slept pretty well. Pulse 100. Tongue furred. Slight cough. She breathes a little through the nostrils.

"Oct. 16.—The trachea and larynx are not so tender. Pulse 98.

"Oct. 17.—The tube was withdrawn, and she breathes tranquilly. The bowels have not acted since the operation. A simple enema was ordered at bed-time. Her appetite is very fair; she is able to take three eggs, beef-tea, &c., in addition to enemata of mutton-broth.

"Oct. 18.—The bowels acted freely. The wound is granulating a little. Air still passes through the opening, which is covered by a piece of muslin gauze.

"Oct. 19.—She is cheerful. Tongue cleaning at edges, but still very much furred in centre. Pulse 95.

"Oct. 21.—Pulse natural. She sleeps tolerably well. She has slight cough, and expectorates a little.

"Oct. 23.—The appetite improves. She was ordered to have half a dozen oysters daily in addition." *

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Inflammatory laryngitis (or rather glottitis) is a disease in which the power we wield of saving existence by restoring a deficient function is most strikingly exhibited. What a paltry scrap of flesh is damaged! Yet how frightful the results are to

* The wound healed on Oct. 28th, and on Nov. 4th she was employed in assisting the nurses in their care of the sick.

witness! The question of life or death is a question of an eighth of an inch more or less diameter in a tube. If the same amount of inflammation were in your finger or at the end of your nose, anybody would laugh at you for going to a doctor about it; if it were in your digestive canal, you would perhaps stay away from lecture, and take some slops, but you would not care to make an accurate diagnosis of its whereabouts. Catarrhal inflammation may even attack the lower part of the larynx itself pretty severely, and yet what one may call "old nursey" practice be all that is required. A girl in an adjoining bed, who came in at the same time as this one, had lost her voice from the tumefaction of the vocal cords, yet I did not think it worth while to treat her further than by keeping her in bed with hot water inhalations and ammoniated salines. But once let inflammation sink through the mucous membrane of the glottis to its submucous tissue, let that become anasarcous, and you see what a piteous call for active interference arises! I say like Œschylus, "you *see*" the call, because, though the patient has all the appearance of screaming loudly, and mayhap is trying to do so, no cry reaches your ears. It matters not if the inflammation be violent or weak, be rapid or slow—directly it has caused the edges of the glottis to swell to the point of not admitting as much air as the lungs want—instantly that it has reached this point, life is in immediate danger. It matters not what was the former state of the patient—the present moment is a present and pressing peril—a Samson or a Lazarus equally hovers on the edge of the grave.

In point of fact, the importance of acute laryngitis depends not on the degree of injury to life, but on the localization of the disease. And hence the value of remedies is closely proportioned to the special definiteness of their action on the part affected. There may be perhaps in the druggist's shop excellent remedies for inflammation, which would act most powerfully all over the body of your patient—all over the body of an animal of three times the size; but you do not want just now to act all over her body, only on that little spot which stands between her and life. Do not run the chance of acting deleteriously on the whole person for the sake of a possible benefit to such a minute portion of it. Do not mistranslate from Hippocrates, "*extremis*

*morbis extrema remedia,"** and ransack your brains for that which is the *extremest* remedy for this extremely dangerous inflammation; but seek for that which will get *nearest* to the seat of peril. When this woman came into the ward, she was (as described in the report) blue in the face, speechless, incapable of swallowing and breathing without labour and noise. It was very obvious that something must be done to relieve her without delay. But her skin was cold, her pulse was weak and quick, and she was worn out by want of food and weariness. Wherefore, though I expected tracheotomy would have to be practised, I thought it well to try other measures first, especially as there are other measures equally local and equally important without being so alarming. I got her warm in bed, gave her teaspoonfuls of hot beef-tea and wine, made the air damp and soft round the mouth with hot steam, and put four leeches on the outside of the trachea. There was some degree of relief from this, and the purple hue of the face wore away during the afternoon. But the next evening it came back again; and Mr. Young carried out the provisional order for tracheotomy. Then the relief was immediate; the lividity of countenance vanished; she shortly fell asleep, and went on afterwards respiring through the tube till such time as the swelling of the glottis subsided enough for her to breathe in the natural way; on which the instrument was taken out.

Tracheotomy is an alarming operation to hear of or to look at, but in reality it is not a dangerous one. Ignorant suicides often open the windpipe by cutting their throats right in front; yet they fail to kill themselves, if they miss the great vessels. And if a wound under circumstances of such violence does not kill, how is it likely to do so when made with the deliberate caution of a surgeon? In point of fact I cannot find on record an instance of its being fatal. Patients often die after it, because laryngitis is so often complicated with exten-

* Few wrong renderings have done so much harm as this, which has led people to entrench themselves under the authority of the shrewd Greek, when they increase the violence of their remedies in proportion to the violence of disease. I have heard M. Chomel do so when bleeding the most severely the worst cases of Pneumonia; and "the more syphilis the more mercury" was the rule acted upon at the Lock hospital not many years ago.

sive pneumonia, croup, diphtheritis; but I cannot find anything to show that tracheotomy has ever hastened the death; nay—in most even of these it seems to have postponed the unfortunate termination. Do not, therefore, alarm the patient's friends by speaking of it as "a last hope," "a final resource," or by any similar weak expression. Doubtless there is danger in the operation—the danger of hæmorrhage into the trachea; but there is not half the danger your patient's friends are sure to anticipate, and are ready to exaggerate, if encouraged by your giving way to weak fears. The consequence of this conduct on your part is that they beg you to postpone it a little and a little longer, till the time has passed for a chance of success. Each minute the throat is becoming more swollen and filled with black blood, and there is more likelihood of the surgeon's hand being stayed by troublesome hæmorrhage; and hæmorrhage is the only thing at all to be feared in the performance of the operation. Each minute congestive pneumonia is becoming more and more probable; more and more incurable, if already existing.

The only reason for delay is that of which you saw an instance in the present patient; namely, a possibility that the excessive urgency of the symptoms may be due to some easily obviated external cause, such as cold, weariness, nervous excitement, hysteria, or the like cause. It was not improbable that a patient, chilled with coming to the hospital and sitting in the waiting-room, might appear worse than she really was, and that warmth, food, and rest, might alleviate the pressing danger. They did so to a certain extent; but not so far as to prevent a relapse.

It is not my place to say much about the surgical part of the business. I will merely tell you what the physician requires of the operator. His requirements are:—1. That blood shall not be allowed to get into the trachea (to secure which the use of a simple scalpel, and the waiting for all serious bleeding to have ceased before the cartilages are cut, are the best means). 2. That the opening shall be large enough to admit of a sufficient body of air; that is to say, it must be capable of being stretched to nearly the diameter of the trachea. 3. That the instrument inserted should be capable of being kept clean by a nurse, and

not easily jerked out by spasmodic movements on the part of the patient. The ordinary curved double cannula seems to me the best.

So far for restoring the deficiencies of the respiratory functions.

But other functions call for care also. You will have seen in the case-book that half a pint of warm beef-tea was ordered to be thrown up into the colon by enema every three hours from the first hour of admission. These patients are usually suffering as much from want of food as from want of air. The deficiency does not kill them so rapidly as the impediment to respiration; nor does it make itself so conspicuous; and for that very reason is apt to be forgotten. But observe the convulsive motions of a patient with laryngitis on trying to swallow, and you will not be surprised that they resist all attempts at feeding by the mouth, and that nurses have no heart to force them. The attempt is another name for strangulation. Yet if they get no nourishment, they are hourly becoming less able to bear up against the depressing influence of the devitalised blood, less able to renew the injured larynx. This is a matter of great moment, not only as regards the present retention of life, but as regards the latter prospects of the patient. For the last hundred years people have been writing a great deal, more or less wisely, about laryngitis; but I do not think any one has noticed this important part of the treatment since Van Swieten a hundred years ago. ('Commentary on Boerhaave,' vol. viii, sect. 813, *ad fin.*) It seems not improbable, from the details given in published cases, that many of those whose immediate danger has been happily postponed by the operation, have died of starvation through the neglect of this simple measure.

Whenever you want to administer nutriment in enema, it is well to prevent it from running off before being absorbed by adding a few drops of an opiate. This was done at first in our patient's case; but it was not necessary to continue it, as no fæces were passed per anum for three days.

When the powers of life have been so reduced by the deficiency of the respiration that the mucous membrane of the intestinal canal rejects the food undigested, you may mix pepsine with it; and you may appropriately administer tincture of

bark and port wine. Both were ordered on this girl's card; but little of either was given, since within forty-eight hours after the operation, her pulse had got full and natural. Always remember what I told you when lecturing on low fever—wine is an adjunct or help to restorative treatment, but if made to take its place, is hurtful.

When the patients begin to take food again by the mouth, you will often find that solids of certain kinds are easier swallowed than pure liquids. This is noticeable in all kinds of dysphagia; in fact, the embracing of a gulp of fluid by the semi-voluntary pharyngeal muscles is a greater effort, and more apt to cause spasm, than happens with a more resisting mass. You can try this any day in your own throats. You must therefore choose as the solid you administer to the patient some one which slips down easily, such as the oysters which have been ordered for this girl.

I feel you expect me to say something about two drugs which have been recommended in acute laryngitis—antimony and mercury. I must confess I have never been able to trace any advantage from their use, either in cases of recovery, or of death. I no longer use them, and do not recommend them to you. The action of the salts of these metals is to increase destructive metamorphosis, and to lower the force of the heart. By such means they certainly do appear to me to have a controlling power over inflammation. But it is a power exercised slowly, and at the expense of depressing the general vitality rapidly; so that they are peculiarly unsuitable for cases where an effect is desired to be quickly produced; for, if enough of them is given to stop inflammatory action in the short time allowed us, a serious lowering of the vitality follows, extremely dangerous in its more remote consequences to patients who have already had to bear the shock of being half stifled.

What I would have you mainly keep in mind, in your treatment of laryngitis is as follows:—

1. If the external and obvious conditions of the patient be such that some part of the symptoms may be due to those conditions, remove them. Warm the surface of the body; saturate with hot steam the air inspired; put on leeches, and hot fomentation to the throat. In special favourable cases, bleed.

2. If benefit do not quickly follow, perform tracheotomy, or get it performed.

3. If a relapse occur after temporary benefit, every minute that the operation is delayed is an opportunity lost.

4. Food must be sedulously administered, if not by mouth, then by rectum. This is especially needful if leeches are put on, more especially if you decide to bleed, and still more especially than ever if mercury or antimony have been thrown in by yourself or others.

5. Let the restored air for respiration be moist and warm; and take care that there is enough of it, by inserting a full-sized double cannula in the trachea, and heedfully watching the orifice day and night, lest it get blocked up by mucus.

As a contrast to the disease in the larynx inducing such serious danger by its locality, but rapidly recovered from by reason of the slight morbid alteration which has taken place, I show you here a larynx taken this week from the body of a man who died of pulmonary consumption. See how extensively it is disorganized. The mucous membrane covering all the upper part is white, thick, and rough; just below the vocal cords on the right side there is a ragged deep ulcer, which has bared the arytenoid cartilages, and caused them to become necrosed by killing the pericondrium; a piece of the dead cartilage projects into the bottom of the cavity. There is another superficial ulcer in a corresponding place on the opposite side. Yet here the symptoms referable to the larynx were of very little weight. The man's voice was indeed hoarse and weak, but not more so than you find in most sufferers dying with a very large vomica in one lung and the other filled with crude tubercles, as we found in this autopsy. There was a considerable secretion of pus also, and pain in the larynx when pressed, but there was no difficulty of breathing, in whatever position the patient lay. Consequently no local applications were made to the organ. There was no demand for local interference, and certainly it would have been useless for the lengthening of life. The need calling for restorative treatment was the weighty one of chronically deficient nutriment to the whole system. The larynx was ulcerated and degenerated for the same reason that the kidneys were shrunken and granular, and that the whole person was worn down to a

skeleton—sufficient aliment was not absorbed to compensate waste. A despairing effort indeed we made to supply this by trying to restore digestive and absorbent powers to the alimentary canal with quinine and iron, and to feed muscle and fat with meat and cod-oil. But in vain. Sentence of death had long before gone forth; and it was hard to say that the decree was in any measure stayed by treatment, however suitable it may have been. My object in quoting this case now is not by it to praise the remedial agents brought into play, but to draw your attention to the rule, that—the immediate danger of diseases is mainly traceable to their locality, the final danger to the extent and intensity of the pathological changes.

I would lay it down as a law to be observed, that in cases where the danger is imminent, the attention of the medical attendant should be directed to locally active remedies; where the risk is more remote, his mind should be turned to those of general agency. Thus in acute laryngitis you are to think of the larynx alone, to the temporary neglect of other parts; in chronic laryngitis, you are to consider the general nutrition in preference to the local injury.

LECTURE XIX.

CAPILLARY (OR SUFFOCATIVE) CATARRH.

Definition of the disease—The mildness and severity depend on the quantity of bronchial membrane involved—Slighter cases essentially of the same nature as the severe cases here brought forward—(First case) Uncomplicated bronchial catarrh—(Second case) The same arrested on the brink of merging in broncho-pneumonia—Treatment by warmth and moisture—The same treatment (Mudge's) applicable to mild cases—Bloodletting—(Third case) Bronchial catarrh fatal by supervening on lung previously imperfect—Autopsy—Such form of fatal disease aptly described as paralysis of the lung—Equally fatal to strong as to puny people—Arises from exposure to cold air during a catarrh—Danger much increased by imperfection of lung.

(*Clinical, St. Mary's, January 23rd,* 1864.)

The late frosty weather has borne its usual crop of many severe acute bronchial catarrhs. Three of these came under my care last week, and I shall take the opportunity of making a few remarks upon the nature of the disease and the treatment required by the patient.

What you see before you is a disease consisting of a rapidly occurring congestion of the mucous membrane of large and small air-passages, resulting in the pouring out of mucus and pus, and tending to destroy life by dyspnœa.

In its slighter forms, and when affecting the trachea principally, it constitutes the well-known "cold on the chest" or "bronchitis"* of the public in general. And when it is

* This word is vaguely applied, both by the vulgar, and by the profession when talking to the vulgar, to any cough with expectoration. I believe patients

prevalent on an epidemic scale, it is called "influenza." In these cases it appears to affect almost entirely the trachea and larger air-passages, and the oxidization of the blood is hardly at all interfered with. When the smaller or capillary bronchi suffer, then a serious interference with the aeration takes place, and the catarrh becomes, what is well called in old writers, "suffocative," or in more anatomical phraseology, "capillary catarrh."

These cases differ from other bronchial catarrhs in the extreme sense of suffocation or dyspnœa, quite out of proportion to the physical signs elicited by auscultation, or to the cough and amount of expectoration.

Important as the slighter cases are on the score of frequency, I cannot find suitable examples for clinical lecturing, for they usually are so much better after the seventh day, if there is no other disease in the chest, that they seldom appear in the wards. I can, however, exemplify by the more severe cases the treatment; the principles of which, and most of the details of which, are applicable equally to all.

The first patient to which I ask your attention is Ellen C., a married woman, aged twenty-two, eight months pregnant with her second child, who was admitted on the 8th instant, during the frost. She is robust and sturdy, and has not suffered any inconvenience from her pregnancy. She had a cough for a fortnight, but it gave her so little inconvenience that she had not laid up till New-year's day, when it got much worse, and was accompanied by such shortness of breath that she was obliged to keep her bed, and was conveyed from thence to the hospital. You saw that the dyspnœa and orthopnœa were excessive, her face was congested and the lips livid, and she brought up by frequent coughing a small quantity of tenacious sputa, partly frothy with large bubbles, and partly consisting of small, round lumps of tough mucus. The pulse was 120. Auscultation of the chest showed the lungs resonant, but filled with whistling, cooing, and all kinds of dry râles throughout, so loud, that the

like much better to hear that they have "bronchitis," than to hear that they are coughing and spitting; but I think among ourselves we ought to give up the term as the name of a definite ailment; for it has been so much misused that it is too late to make it scientifically distinctive.

few moist sounds were seldom audible. She appeared in imminent danger.

The whole chest was immediately enveloped in a jacket poultice of linseed meal, and she was directed to breathe entirely through a Mudge's inhaler, kept supplied with hot water.

On the next day, the 9th, the dyspnœa was much relieved, and the pulse had sunk to 100. The same treatment was persisted in.

On the 13th the pulse was 88, and she left off the inhalation; on the 16th it was 72; the sputa were more opaque, and she breathed easily. The poultice was then discontinued, and a blister was applied to the chest. An ounce of decoction of bark was also ordered to be taken three times a day.

This is a case of generally diffused acute bronchial catarrh without tendency to pneumonic condensation.

The second case is that of Edward C., aged twenty-four, a bricklayer, now in Albert ward. He said he had been first seized by a cough and pain across the front of the chest on Christmas eve. This took him off work immediately, but his breath did not get short, as it was when we first saw him, till a fortnight had elapsed, and the frost had commenced. Before admission he had been attending a few times as an out-patient, and it was on the last occasion of his so attending, viz., on the 13th instant, that Dr. Markham sent him upstairs to bed, as too ill to be allowed to leave our doors. The dyspnœa and lividity of face were not so great as in the last patient, but there was the same general diffusion of sibilant râles without dulness on percussion marked in any region. I say the dulness was not marked in any part; but after examination by the stethoscope had shown some fine crepitation beneath the right clavicle I percussed again, and then some of the bystanders thought that the upper lobe was not quite so resonant as the other. The tongue was white and furred, the sputa copious and frothy, and reported to have sometimes a yellow stain.

He wanted to go home to fetch "his things," but his request was not complied with. He was ordered to be put to bed

immediately, and to be cupped to the extent of six ounces beneath the right clavicle, the chest to be enveloped in a jacket poultice, and the vapour of hot-water to be inhaled.

On the 16th there was no fine crepitation or dulness on percussion. On the 20th the sputa had become purulent, and the cough alleviated during the day, though troublesome at night. He was then ordered two grains of quinine thrice a day, and to leave off the poultice, and has continued to convalesce.

This is a case of acute bronchial catarrh arrested just on the verge of resulting in bronchial or catarrhal pneumonia.

You may observe that the treatment of both these cases has been essentially the same as regards the most seriously injured part, the bronchial mucous membrane. Moist warmth has been kept continuously applied to both the inside and the outside of the chest. Moist warmth is the most powerful restorer of arrested circulation and vital action that we possess, the safest therapeutical engine we know of, because the most direct renewer of life.

Perhaps you may exclaim that this mode of inhalation limits the supply of oxygen, which is so much needed for the aeration of the blood. I frankly grant that there is less free oxygen in warm steam than in cold air, and that therefore certainly less oxygen goes into the trachea; but I am not sure that less oxygen is absorbed by the pulmonary membrane. For this dilution with warm steam softens the tissue, and makes it more apt for endosmose; and even in its immediate action it may cause more oxygen to be digested (if I may so say) from the weak, than from the strong supply.

But oxygen (as I have often pointed out to you) is exceedingly injurious to tissues in the state of partial death which we call inflammation, and therefore the limiting, to such extent as is consistent with safety, its supply is not a thing to be avoided.

You may ask whether this mode of treatment be applicable to the milder cases, such as you will have more to do with in private practice than in a hospital. Yes—there is nothing like the inhaler for a cold on the chest, for which, indeed, it was first

introduced by Mudge.* But you will not persuade patients with a will of their own to submit to a jacket poultice, unless they are nearly as ill as our present patients.

If there is much thirst, effervescing draughts of citrate of ammonia seem to be liked; but when the illness is a serious one there is some danger in advising treatment by drugs, because sick persons are so prejudiced by habit in its favour, and it is so convenient to them, that there is a risk of their neglecting the other and more important parts of the advice.

As soon as the mucus became opaque, you will observe that I ordered quinine. Begin your tonics always as soon as you can, for they enable more food to be digested, and thus they shorten the convalescence.

In the second case, bloodletting by cupping-glasses was ordered beneath the right clavicle. This was done, because pneumonia seemed to be just commencing in the upper lobe of the lung—a very dangerous situation for it to commence in, much more dangerous than in the lower lobe, and demanding prompt measures as much as the more generally diffused bronchial affection.

The third case I shall commence by the post-mortem dissection. On Wednesday some of you saw the examination of the body of a woman aged about forty, externally in good condition, and not emaciated or presenting any aspect of chronic ailment. The removal of the ribs disclosed the right lung contracted very much, and clothed as to its lower part with a smooth white leathery coat, not adherent to the walls of the chest, and but slightly to the lung, though it had bound the lobe together in its contraction, and had caused atrophic degeneration of its tissue. It was probably the remains of old hydrothorax, for which she was in St. Mary's about three years ago. The upper lobe of the same lung was not much better fitted for receiving air, for it contained old and contracting chalky tubercle, and a vomica of ancient date as big as a chestnut. In the left lung there was no tubercle or consolida-

* 'Radical cure for a recent catarrhous cough, with a chapter on the vis vitæ, &c.' Second Edition. 1779.

tion or signs of pleuritic disease; but the whole substance was doughy, retaining the marks of the five fingers when the hand was pressed upon it. The tissue was not nearly so crepitant as it should be, and it was black with venous blood. Some parts seemed more decidedly emphysematous. The trachea and bronchi were deeply reddened and dry, no pus exuding, as it so often does, from their orifices when cut across. Heart and abdominal viscera were of quite normal appearance.

This woman was in the hospital but four days, and was too ill for us to learn much from her during life. She was a quiet gentleman's cook, and, though habitually subject to cough and short-winded, had been able to do her moderate work somehow till the arrival of our late severe weather. That laid her up, and in a week reduced her to the condition in which she was on admission, namely, hardly able to breathe even when propped up in bed, with the face livid, and the purple blood-shot eyes starting out of their sockets. I do not think she had any expectoration. Dry cupping and poultices did no good, and she was unable to foment the bronchi with Mudge's inhaler. As from the resonance on percussion over the cardiac region, I had suspected there was a good deal of emphysema, I gave her some lobelia and ether, but I could not perceive that it brought any relief.

There is more instruction to be gained from the appearances after death. I dare say some of you can call to mind that terrible February during the Crimean war, when the stern sovereign of our stern enemies was suddenly death-struck, while actively engaged in his patriotic duties. Few can forget the ghastly satire, too bitter for us even at that bitter time, with which 'Punch's' artist hailed the event; and medical men remember how the public was puzzled by the bulletin of the German physicians, who announced the death as due to "paralysis of the lungs." By this unusual, but not inapt term they intended to designate that complete obliteration of function which we see in such lungs as these; and the Emperor's illness was of the same nature as I am quoting three examples of to-day, namely, inflammation—a partial death—of the bronchial mucous membrane resulting in obliteration of function.

It arose too under the same circumstances of exposure to severe dry frost during a catarrh.

People were surprised at the rapid sinking of a man so remarkably muscular and strong as our gallant enemy. But I happened at that very time to be called to see a country clergyman of large frame and great height, who sank in the same way from fatal bronchial catarrh, brought on by exposure during a cold on the chest. So that I felt less surprise than others. And I am rather disposed to think that big burly people, once severely smitten, yield to the disease even sooner than others.

I have noticed in the second case, how anxious I was to prevent the man from going out in the cold after we had once got him up into the ward. My reason was a feeling of the extreme danger not only of the extension of the catarrhal state which is brought about by cold air, but also of the penetration of the inflammation to the tissue of the lung (lobular or catarrhal broncho-pneumonia). Of the two ways by which inflammation penetrates to the lungs, from the inside or the outside, the former is much the worst. I have no doubt but what it was the unfortunate independence of control, which is a necessary part of sovereignty, that destroyed the Emperor. He was determined to go on with his duties, come what might, and nobody's will was strong enough to say, "We will not let you."

Any disease which has previously limited the area of available lung increases very much the danger of capillary catarrh. In the patient who is my present text the atrophied state of the lower right lobe, the ancient tuberculosis of the upper, and the possibly prevenient emphysema of parts of the left lung took away her chances of renewed life. Had I been aware of them all, I should have given a still more unfavorable prognosis than even the symptoms made me give.

In the last sentence I applied the epithet "possibly prevenient" to the emphysematous state of the pulmonary tissue. I did this because the patient had given us during life some broken history of shortness of breath affecting her for a considerable period, and it would be difficult to say that this degenerated condition of the lung membrane had not existed as its cause. But I said "possibly," because in fatal cases of capillary catarrh emphysema is so often found, even in patients previously

healthy, that it certainly must be a consequence, and not the origin, of the complaint. This is especially the case in infants, whose lungs, when they die of bronchial catarrh or of broncho-pneumonia, are almost invariably highly emphysematous; a state of things which their age and previous good health shows to be capable of very rapid development.

LECTURE XX.

PNEUMONIA.

*Three cases of pneumonia—*1. *Frank uncomplicated double pneumonia in a temperate man, with excessive dyspnœa—Cured with venæsection, jacket-poultice, continuous feeding and wine.* 2. *Pneumonia of upper and lower lobes of one lung, very slight in the other lung, in a broken-down old man—Cured with cupping, jacket-poultice, continuous feeding and wine.* 3. *Congestive pneumonia of lower lobe in typh-fever—Cured with half-jacket poultice, cupping beneath scapula, continuous feeding, wine and bark.—Commentary—Pathology of pneumonia—Importance in proportion to quantity of tissue involved, not to staye of progress—Hence the value of a ready and quick means of checking its progress—Bloodletting—Action of it—General and local compared—Ill effects of loss of blood—Mode of judging of the necessity for it—Compensation for it—Poultices—their Action—Especially adapted for infants—How to make them—Alcohol, when required—Effect of position in the pneumonia of typh-fever—Bloodletting—Purgatives—Blisters—Antimony and mercury.*

(*Clinical, St. Mary's, May* 10*th*, 1862.)

There have been three patients under my care in the Albert Ward for males this week to whom I have drawn your attention, as illustrative of the most common phases under which we have to treat pneumonia in the adult.

No. 1 is a case of frank uncomplicated inflammation of the pulmonary tissue.

R. G., aged twenty-one, a very steady and temperate policeman, well made, robust, and never previously ill, was on April

12th taken with severe rigors, followed by a dull pain in the side, and cough. He got worse under treatment from day to day, and on the 18th was so alarmingly ill that his friends carried him to the hospital. I saw him shortly after he was put to bed, and certainly felt that they were justified in their alarm. The respirations were abdominal and were thirty-six in the minute; he struggled and gasped for breath, his lips and tongue were livid; the pulse was very quick and small, but the heart beat strongly in spite of its great rapidity. The expectoration was copious and glairy, of a deep tawny colour, and with a few small striæ of blood in it.

The whole of the ribs on the right side were motionless during inspiration, while the movement of those on the left front was very visible. In the upper half of the upper right lobe, and in the lower right front, there was fine crepitation and comparative dulness on percussion. Beneath the right shoulder-blade the dulness was more absolute and there were coarse râles. Beneath the left there was fine crepitation. It was obvious that active inflammation raged throughout nearly the whole (if not quite the whole) of the right lung, and in the lower lobe of the left, and that it was most advanced in the back part of the right side. At most a third of the pulmonary tissue was in working condition, so no wonder that exaggerated puerile breathing was heard in that third, and the ribs were heaved in an extraordinary manner, where heaved at all.

The patient was bled to three-quarters of a pint from the arm, took eight ounces of port wine during the twenty-four hours, and beef-tea every two hours, and had his chest completely enveloped in a thick hot linseed-meal poultice. He was ordered also three effervescing draughts of citrate of ammonia* daily.

I am told that relief began immediately after the venesection. At all events, next morning there was a great improvement, the breathing being much easier, the patient expressing himself as "stronger," and the sputum being but slightly tinged with brown. On the succeeding day there was a further step gained,

* *Ammoniæ sesquicarb.*, ℈iss, *Acidi citrici*, ℈iss. This is so refreshing to the feelings when one is tired or ill, that I think it must be a directly constructive drug. Both the carbonic acid and the ammonia take part in forming the substance of the body.

and the pneumonic hue had disappeared altogether from the mucus expectorated. However, in the parts of the right chest in front whence I raised the poultice temporarily for examination, viz., an inch beneath the collar-bone and an inch beneath the nipple, the dulness on percussion seemed very decided. But I will not allow myself the enticing task of describing a patient's daily progress towards health: suffice it to say, that on the 26th, eight days after admission, the effervescing draughts were exchanged for decoction of bark, and that to-day, May 10th, he goes out well. The respiration is quite natural, percussion and expansion normal in the upper lobe and back part of the lower lobe recently inflamed; but there still remained yesterday some little crepitation mixed with the healthy breathing, and slight comparative dulness below the mamma. I dare say it is gone now.

No. 2.—Hugh J., aged sixty-three, porter at a charitable institution, a respectable man, but not quite free from a suspicion of petty tippling, had an attack of pneumonia of the lower half of the left lung under my care about this time last year, from which he entirely recovered so far as the local symptoms were concerned, but he has looked older since. At the beginning of last week, April 28th, he was again taken ill. I saw him at his home on the 2nd of May, and sent him up to this hospital. On the right side the whole lower lobes and the greater part of the upper lobe were consolidated. In the upper lobe, fine crepitations were heard throughout. There was also some fine crepitation in the back part of the left lung. His tongue was thickly furred and clammy, his hands tremulous, and his manner excited. There was also occasional delirium. The pulse was large, short, and empty—such as is usually found with the inelastic arteries of old age. He was cupped that day to six ounces on the cardiac region, and on the morrow to the same amount beneath the right clavicle. The chest was completely enveloped in a jacket of linseed poultice. He was ordered eight ounces of port wine, food every two hours, and three effervescing draughts daily of carbonate of ammonia and tartaric acid.

May 5th.—Pulse 128. On the 4th there was considerable diarrhœa, which ceased on the following day-break, after a small dose of Dover's powder.

May 6th.—Less crepitation in left upper lobe, but dulness on percussion, and coarse mixed with fine crepitation in right upper lobe. Sputa have been for the last three days very abundant, and of a deep rusty colour.

No change in the symptoms, except the gradual diminution in quickness of the pulse, is noticed till to-day (the 10th), when the sputa are darker and more like prune-juice, but showing signs of improvement by having some specks of opaque purulent matter in them. The tongue is also a little moist, and only gets quite dry after sleep. He may be considered to have turned the corner in his progress towards recovery, and I have no hesitation now in pronouncing a favourable prognosis. No change has been made in the treatment.

[On May 16th he began to take bark and ammonia. On the morrow the expectoration is noticed to consist of clear mucus for the first time since his admission, and he left the hospital to return to his place on May 30th. Case-book 161, p. 187.]

No. 3.—John L., aged seventeen, was brought here from a house where his mother and sister have just died of "typhus fever," according to the account of an aunt who came to see him. He was taken ill on April 20th, and when admitted on April 23rd, was as unfavourable a subject to look at as I ever saw at that early period of low continued fever. There was complete prostration and constant delirium, the tongue was clammy and tremulously protruded with great difficulty from the dry lips, the pulse 120 and small, the skin hot and dry. The eyes were bloodshot, and on the front of the body were from thirty to forty fever spots of various hues, some slightly raised and inclining to rose colour, some livid, some completely purpuric and not changed by pressure. I mention these details because it is such cases of typh-fever, where the hæmatine of the blood is apparently so much poisoned, that are aptest to be accompanied by inflammation of the lungs. He was treated in my usual way with hydrochloric acid and tepid sponging, and was going on as usual very well till May 3rd, when some fine crepitation and dulness on percussion were found in the lower lobe of the right lung, accompanied by slight cough, but without expectoration. On the 4th he was cupped beneath the right scapula to four ounces, a poultice was applied over that part,

and he was directed to be kept turned over on the left side. On the 7th the breath-sounds were healthy except a little coarse crackling mixed with vesicular breathing, such as is generally found in typhous patients; the percussion was normal. The tongue and other muscles were scarcely, if at all, tremulous. He is now going through a rapid convalescence under bark and wine, and in a few days will doubtless be able to stand on his legs.

Whilst speaking of this case, and before I enter upon the treatment of pneumonia, I will make one observation to you on the importance of the diagnosis of the cause of dulness on percussion in acute fevers. In this instance there was no doubt about the prognosis of the rapid termination of the congestive inflammation. But you must not say the same on every occasion of finding the pulmonary tissue condensed in fever. A man will leave the hospital for a distant home in a few days, who has recovered very slowly from an attack of spotted fever rendered severe by dysenteric diarrhœa. He has had at the same time primary syphilitic sores and a bubo, and had been taking mercury;* so that his tedious convalescence was quite accounted for by his previous history. Besides this, during the time he was laid on his back, I had found a considerable amount of consolidation about the middle of the right lung, and at the apex crepitations. As at that time he was not well able to give an account of himself, I was inclined at first to set this down to pneumonia, to treat it as such, and anticipate its disappearance. You saw, however, that this morbid state remained unaltered when I examined him for his discharge, and it seemed to me by his tale of former winter cough and hæmoptysis to be due to chronic tubercle. He will probably become consumptive some day. Learn from this case to take good heed before you hail a consolidation of the lung in fever as merely congestive.

Now to return to the text of to-day's lecture.

* I would remark in passing that this man's dysenteric diarrhœa (i. e. pain in the bowels with fever and blood-stained stools) came on very early in the illness, namely, on the third day, although the usual tendency of continued fever this year is by no means dysenteric. He was under the influence of mercury at the time. The action therefore of that drug is at least not preventive of bowel affection. Is it curative?

In pneumonia a most truly vital organ is smitten; and so far as the disease extends, the destruction is total. A consolidated or even congested piece of pulmonary tissue is absolutely powerless to fulfil its duties, and yet that those duties should be fulfilled is essential to animal life. It is easy therefore to understand that the gravity of the pneumonia is in direct proportion to the quantity of lung involved. The degree or form of the inflammation or condensation is of much less weight, so far as immediate danger is concerned, than the extent of tissue over which it is spread.

Hence comes the importance of having some ready and effectual means at hand to check the march of the inflammation into fresh parts. If we can do this, we contribute more certainly to renew the patient's life than if we regulated, however favourably, the progress of it in already affected places. No means is so readily applied, so immediate in its operation, as bloodletting. Its action has not to be waited for, like that of drugs in medicinal doses, but begins at the moment of application. That is a great point where time is so valuable. I believe also that it is the most active of the agents at our disposal, and that rightly used it is the saving of many a life in pneumonia. But at the same time I would have you clearly understand that "this is not a bow for every man's drawing" at every time, that though it is most rapid and active for good, it may be also most rapid and active for evil, and that foolishly and thoughtlessly used it has caused many a death.

The good done by bloodletting in pneumonia is mechanical. The pathological state which asks its aid may be drawn as follows:—by the temporary death of a portion of the lungs the blood cannot be quickly enough passed onwards through their tissue; it can run freely as far as the right side of the heart, but there it is stopped; the throng pressing onward from behind makes matters worse, and thus the balance between the venous and arterial heart is destroyed. You can feel the apex of the organ beating strongly against the ribs, the muscular action being excited by the presence of an unwonted amount of venous blood; yet the artery at the wrist is at the same time striking your finger with a weakened force. Take away some of the blood from the veins, and the balance is restored; the pulse

becomes in technical phrase "freer;" that is to say, the heart being relieved of the undue crowd in the right side, is not checked in its contraction, but is able to clench upon its contents, and supply them steadily to the arteries.

Judge then of the fitness of this treatment by the balance between the heart and the arteries. If the apex of the former organ strikes strong, while the pulse at the wrist is oppressed, act freely and confidently. If, on the contrary, the ventricles are weak, while the pulse is large and rapping, be cautious in what you do, and if you draw blood at all, let it be by cupping the chest.

The advantages of general and local bloodletting are of essentially the same nature, though the operations differ somewhat in degree, and are diversely applicable. Where the patient, previous to his current illness, was in vigorous health, actively digesting his food and actively renewing his tissues, he will bear and easily repair the abstraction of a good large quantity of blood. And a good large quantity of blood is most conveniently drawn from the arm. To get the full advantage of the remedy, you would practise venesection. But if the pneumonia has come on a person previously an invalid, or in weak health, you fear for the possible bad consequence of your treatment, and you cast about for some means of getting the greatest advantage out of the least loss of blood. This is obtained by cupping on the region of the heart. Your four or five ounces taken from thence in a delicate invalid seem to produce as much effect corresponding as the loss of twelve or fourteen let from a vigorous man's arm.

Or, if it be more convenient, you may put on leeches. As a rule however I prefer cupping, for you can easily graduate the depth of the cuts, so as to be able to stop them with ease: whereas, leech-bites will sometimes go on oozing for a long time unperceived into the poultice, which (as I will instruct you presently) is to be put round the chest.

Another advantage of local bloodletting is the relief it gives to pleurisy. There are few cases of pneumonia where there is not some amount of inflammation of the serous coat of the lungs or ribs; and though the feeling of oppression in the chest overtops and deadens the stitch in the side, which would other-

wise be felt, yet there is no doubt but that the pleurisy adds to the distress, and the relief of it is no mean matter. Local bloodletting is for this purpose more effectual in proportion to its quantity than general.

You will find some authors try to ground rules about bloodletting in pneumonia on the supposed degree of consolidation of the pulmonary tissue. These rules are practically inapplicable. They say you should bleed so long as you know that the lung is in its first stage of condensation (*i. e.* congestion) as proved by fine crepitation and incomplete dulness; and that you should not bleed after it has once become completely consolidated so as to admit no air into the finer bronchi, a state declared by the sound of coarse crepitation and complete dulness. Such a rule is quite useless at the bedside, and will often prevent your employing active practice in cases where it is urgently called for. In the first place, in a majority of cases fine crepitation is masked by the mixture of coarse crepitation, produced by the presence of catarrhal mucus in the larger bronchi, especially in the catarrhal pneumonia of the young. If you wait till you can distinctly hear fine crackles, you will wait too long. Moreover, the dulness of congestion is not necessarily incomplete; as you may satisfy yourselves by examining recent congestion in continued fever, which is often very absolute, though so transitory that a mere change of position may remove it in twenty-four hours. Then again, a slight collection of serum in the pleura may make the lower lobe dull at the very outset, and prevent your bleeding at a very early stage, if you were to follow the rule I quoted. But the most serious objection to the rule is, that you may have all stages of partial tissue-death going on at the same time; one lobe, or one part of a lobe may have advanced even to yellow hepatization, while another part is just beginning to enter into red hepatization, that is to say, into a condition which by general consent is most capable of benefit from bloodletting.

Your best guide to the necessity will be the dyspnœa. If your patient is inhaling laboriously from twenty to thirty times a minute, straining convulsively the muscles of inpiration, you may know that the congestion is recent and is spreading to new spots; and you will act wisely by endeavouring to

stop it. And your best check against excess will be the balance of the heart and arteries.

Remember that in letting blood you are wielding a dangerous weapon. While from a mechanical point of view nothing can equal the aid it gives, at the same time its more remote or physiological action is baneful. If you gain the inestimable boon of a restoration of balance in the circulation, and a consequent relief of dyspnœa and renewal of life in the lungs, you must not complain if some evils attend the process. The mere loss of so much "liquid flesh" is in itself an evil, but a minor one; of greater import is the increased proportion of effete fibrine and water which it induces, the diminution of solid hæmatine, and the consequently diminished power to bear up against the destruction, however temporary, of so much pulmonary substance.

Remember also now what I told you about bleeding in a former* lecture on anæmia and bloodletting—be careful to supply material in the place of that which you are taking away. Let the patient be fed with beef-tea or milk every two hours, just as if he had typh-fever. This is to be done in all severe cases irrespective of other treatment; but I mention it next to the bleeding, to remind you of the close connexion which there is between the two, between exhaustion and supply. It contributes as much to your success, whether you elect to bleed, or whether you do not.

I come next to another direct restorative about the use of which also anywhen and anywhere you need have no manner of hesitation. You can always, without any exception of age, sex, condition, cause, or complication, follow a treatment to which I attribute more power of saving the lives of pneumonic patients than to any other, and which you see me apply in all cases;—I mean the wrapping up the chest in a large bath-like poultice. The action of warmth and moisture on animal tissues tends directly to increase their vitality. You may see with the naked eye a healthy surface of skin under their application renew its life; it empties itself quicker of its pale, livid, venous blood, and glows with a fresh access of the bright arterial stream; it swells up elastically with fresh juices; it is more delicately

* "Former" in respect of time of delivery. It comes later in this volume.

sensitive when used for the purposes of touch; at the same time it feels no pain, but on the contrary an exquisitely pleasurable calm. You cannot see with your eyes this renewal of life in internal organs, but you may infer that what takes place in one tissue takes place also in another, with modifications of course dependent on distance and other difficulties of application. And you may infer it also in pneumonia from the results; for you find the dyspnœa diminished, the breath being easily drawn in spite of the weight of the poultice; the hot fevered skin becomes moist and active, and soon the ribs begin to move again, and air is readmitted into the hitherto paralysed lung-tissue. These effects are the most strikingly shown in the case of infants, whose thin chest-walls are rapidly and efficiently penetrated by the influences of the poultice, and in whom also this remedy is the only one really safe and invariably necessary; for they cannot afford much loss of blood. I cannot speak too strongly of the importance of your adopting it, and letting all other treatment be passed over rather than this.

The poultice is best made of linseed meal, because that keeps moist the longest. It should be spread half an inch thick on a cloth or flannel as broad as the circumference of the thorax. If any portion of the upper lobes be inflamed it is essential, and even if only the lower lobes are inflamed it is prudent, that the poultice should be deep enough to cover the whole chest from the collar-bones to the hypochondria. Lay the patient in it on his back, and fold it across the front till it meets. In adults it will usually keep in place of its own accord; but in children you should have a tape stitched on in front and a tape behind which you can tie over each shoulder in the manner of a shoulder-strap; otherwise the little prisoners wriggle out of their soft breastplates. When once you have got this jacket poultice *in situ*, keep it there, and desire the nurse, on pain of dismissal, never to take it off till another hot one is ready to go on.

In low fever the continuous poultice somewhat stands in the way of the cool sponging. But in practice this last part of the treatment of fever becomes less necessary at the period when congestion and pneumonia occur; the skin has then become cooler and more active. Besides, the poultice often takes the

place of sponging by softening and suffusing with a gentle perspiration the whole body. I have often heard pneumonic patients grumble at the way in which the moist warmth makes them sweat. Of course they were comforted when they were told it did them good.

Alcohol, especially in the form of port wine, is very useful in treating pneumonia. Even in hearty temperate persons, when you are going to bleed, it is desirable to give a little, as was done in Case 1. A glass of hot negus before the operation, makes it safer. And whenever you observe the nervous system prostrated by the extent of the disease, so as to produce tremor of the hands, quivering of the tongue, delirium, dry brown tongue or a tendency thereto, throw in a little wine from time to time. Old persons, especially in the upper classes, who have been used to good living, and persons of all ages who have indulged too freely in alcoholic liquids (as Case 2), may begin wine immediately; you need not wait for any symptoms as above described. In children, on the other hand, it is rarely required, and they get well quicker without it.

In the administration of alcohol in any form, a rule directly opposite to that which governs the giving nutritious food should be observed. The quantity considered necessary, in proportion to the previous habits of the patient, should be given in one, or at most two doses during the twenty-four hours. The frequent repetition of small doses has appeared to me injurious, or at all events less beneficial than the same quantity in a few larger doses.*

In the pneumonia of low fever position is of great importance. As long as the walls of blood-vessels retain their natural elasticity they are able to bear up against the gravitating force acting of course on the blood as on all matter: but when their life is lowered in disease, the elasticity is the first vital property that suffers, and the blood then is drawn down towards the lowest part of the viscus. This is especially the case in low fever. Lay the patient, therefore, on the side opposite to that affected (as was done in Case 3), or even on his face for a time, if both sides are affected; and thus the very force of gravitation which you feared as an enemy, becomes a friend, by withdrawing the congestion from the weaker point.

* For reasons see Lecture XLIX. "On the use of alcohol."

This boy was cupped on the side. You need not shrink from taking a little blood in low fever, where an important viscus requires it. A large portion of the vital fluid you take away is poisoned and dead already, and unfit for the purposes of life, so that you are not robbing the patient to the full extent of the quantity drawn. You saw the lad was much more lively after his cupping than before. It is better to bleed locally than generally, because local benefit is expected from it and not general, and the dyspnœa is seldom very urgent.

I always shrink from giving purgatives in pneumonia. My reason is because I have observed that patients who have diarrhœa at the same time generally do very badly. And if natural diarrhœa does harm, I infer that artificial diarrhœa does harm also. I prefer to produce constipation by opiates, where it does not already exist. If the rectum gets blocked up with fæces, it is easy to wash it out with warm gruel.

Blisters have seemed to me to do harm in a few cases where I have known them to have been employed before the patients came under my care. It is usually non-medical persons who put them on, under the general idea that they are good for a cough with pain in the chest.

I am afraid I must equally condemn antimony and mercury, drugs formerly often administered in pneumonia. When I used them I was often and often driven to leave them off on account of bad symptoms due to their agency, and in prosperous cases I always felt doubtful if the success could be fairly traced to them. Looking now at disease by the light of the theory of cure which I always set before you, this failure is rationally explained. The drugs named are pure destructives; the disease is also one of pure destruction; there are in it fewer of the phenomena of retention than in any other, and none of the insertion of a morbid poison in the system. The gain then which destructive drugs can bring is infinitesimal, and the risk infinite. They do more harm than bleeding by their physiological action, without any of the mechanical recommendations of that remedy. They merely aid the disease in its worst effect.

LECTURE XXI.

PNEUMONIA.

Record of six cases during recess—(1st Case) Caution about bloodletting—(2nd Case) Pneumonia of upper lobe in third stage, viz., of abscess—Repeated attack of pneumonia during convalescence, fatal to this patient—Post-mortem examination—Remarks on treatmenl—Cause of second attack—(3rd Case) Pneumonia in Bright's disease cured—State of lung afterwards—(4th Case) Pneumonia in measles—Catarrhal pneumonia—(5th Case) Pneumonia treated with opium—When opium is desirable—Reduplicating pulse—(6th Case) Pneumonia in a pregnant woman treated with opium—Remarks on vomiting in pregnancy—Additional cases present in hospital—(7th Case) Early occurrence of pneumonia in typh-fever—(8th Case) Double pneumonia in a fatal case of delirium tremens—(9th Case) Double pneumonia slowly progressing from one lung to another—Pleurisy also on one side—Food in convalescence—Mode of recovery of consolidated lung—(10th Case) Catarrhal pneumonia—Severity of symptoms at first, and rapid relief—Treatment by poultices and local bloodletting—(11th Case) Double pneumonia in a man of drunken habits—Also catarrhal, and therefore distinguished by the severity of the symptoms at first—Treatment with opium, poultices, and cautious cupping—Delirium—Wine—(12th Case) Pneumonia morientum in death from other causes. Recapitulation.

(*Clinical, St. Mary's, May 2nd*, 1863.)

I BELIEVE complaints are sometimes made against clinical lecturers, that they do not sufficiently interest their pupils by

presenting for consideration strange and rare cases. I shall be deeply grieved if my exertions cease to arouse your attention; but I must at once say that it is a matter of conscience with me to set before you as subjects for instruction in the lecture theatre, and for the less formal bedside teaching, primarily and mainly those forms of disease which you will most commonly have to treat in after life. The time I shall endeavour to allot to each will be proportioned as closely as possible to the frequency of its occurrence. I believe that to be the most accurate measure of its importance to the public, and therefore to medical men.

Since I last addressed you before the Easter vacation there have been six cases of pneumonia under my care in the hospital, which are sufficiently ordinary examples of the disease to present several points of practical instruction.

I. Caroline D., though a sexagenarian, has never been seriously ill before, and was quite well till the 3rd of April, when she suddenly lost her appetite and felt ill all over. She had a bad cough, but no local sensation of pain in the chest or elsewhere. She was admitted April 10th. Her pulse was 104, empty, sharp, and weak. The inspirations were thirty-six in a minute. There was dulness on percussion and fine crepitation of the lower right lobe, and some fine crepitation mixed with healthy breathing in the lower left lobe. She was ordered—℞ *Ammonia sesquicarbonatis gr. iv. Œtheris* ♏ *xv. Misturæ Camphoræ* ℥*j; alternâ quâque horâ. Hirudines xii infra scapulam dextram, et postea cataplasmata assidue applicentur.*

The signs of inflammation did not further spread, but the right lower lobe became consolidated, so that on the 18th bronchial breathing and dulness on percussion is noted in that situation. On the 22nd the pulmonary tissue began to become pervious again, and there was the well-known "crepitation of return" in the place before consolidated. The medicine was changed for a mixture of squill and senega, but she complained that this nauseated her, and it was left off, and no drugs given at all.

You may perhaps be surprised that in treating a patient so old as three-score, and where the pulse was empty, sharp, and

weak, I should have ventured upon taking blood. But I had calculated here upon receiving valuable aid from the digestive organs. Like most persons who have lost appetite from severe febrile disorder, she had eaten scarcely anything for several days. I calculated therefore that a continuous animalised diet, such as beef-tea and milk every two hours, would more than replace a moderate loss of blood, and I should have been sorry to miss the advantage which its local application confers by staying the progress of congestion towards condensation in the pulmonary tissue.

In old age it is quite true that the detraction of blood does more harm than in youth or middle age, because there is less strength to spare; but at the same time it does more good than in youth or middle age, because of the tendency in later life which congestions have to increase, and to increase so very insidiously, and to recur when checked. So you must not forget what a powerful weapon you are wielding, and how double must be your caution in old age.

The second case of also an aged woman, is in point here, although a fatal one.

II. Mary McK., Admitted February 27th. She did not know the date of her birth, but looked upwards of sixty. She had been quite well of late years till three weeks previously, when she had slept in a damp bed after being exposed to much heat as a washer-woman. This was immediately followed by rigors, feeling of complete prostration, and loss of appetite. I fear she had but little care taken of her during the height of the inflammation, for she seemed on admission to be almost moribund, and absolutely refused food. On examination of the chest the upper lobe of the right lung was found completely condensed, absolutely dull on percussion, with tubular breathing and coarse mucous râles, and in some places coarse bubbling. There was but little cough, but copious green expectoration.

From the localization of the part affected in the stethoscopic examination, it was very doubtful whether this were not a case of senile tuberculosis. But the suddenness and recency of the invasion were against that diagnosis, and I inclined to think it the third stage of inflammation of the upper lobe.

The diagnosis made but little difference in the treatment; for I gave her quinine and cod-liver oil, much as I should have done, had it been determined to be tubercular phthisis.

We had great difficulty about the patient's food; she said, on admission, she could eat nothing, and at first she persisted in eating nothing voluntarily, the nurse having to use actual force in giving her the beef-tea and milk which I had insisted upon her swallowing. She improved considerably under this treatment by three weeks after admission. On the 18th of March I found there was not the same extent of dulness below the right collar-bone, but there was still very considerable dulness and very coarse low-toned bubbling râles. She was recovering also her flesh and strength, and was capable of being entrusted so far with her diet that she was allowed to be dressed and have ordinary diet and porter with the other patients. She seems to have freely used her permission to get up, and to have fatigued herself very much on the 19th and 20th. On the morning of the 21st she had a shivering fit, she lost her appetite and became feverish, and had severe pain in the head. There was then a good deal of typh-fever in the wards, and it seemed very much as if she had caught that disease. So she was given a couple of emetics, continuous food, wine, and hydrochloric acid. But on the 26th my attention was drawn to her lungs by the expectoration of orange-coloured sputa in considerable quantity. Her tongue had become dry and brown in spite of the wine, and yet there was none of the nervous symptoms (such as obtuseness of sense, delirium, or tremor of the muscles) which one looks for in cases of typh-fever. An examination of the chest detected the serious fact that the diagnosis had been too hasty, and that the symptoms really were due to pneumonia. The whole of the right lower lobe was already impervious to air from recent consolidation, and there was fine crepitation also in the left lower lobe. Half a dozen leeches were put on the latter side, and a jacket poultice over the whole chest: bark and wine were freely given: but little hope could be entertained of preserving life. She survived just long enough for the expectoration to become purulent, but died on the 6th of April.

At the post-mortem examination we found the right upper lobe of the lungs was in many parts consolidated and of a

grey colour, and of a fine granular appearance, shading off in the natural red colour in the parts pervious to air. There were in that lobe several small abscesses, and one as large as two walnuts. The right lower lobe, and to a less extent the left lower lobe, were consolidated and of a red colour, leaving on the whole about six inches square of the whole pulmonary tissue permeable to air. The ventricular parietes of the heart were pale in patches, and the mitral valves white and thickened. The kidneys exhibited an atrophied appearance, the cortical structure being diminished in quantity and containing many small cysts. The liver had a thickened opaque capsule and a granular (nutmeg) appearance when cut into.

Here are two examples of pneumonia in one patient. The first attack in the upper lobe she had rendered much more serious in its consequences than it otherwise would have been by starving herself. It had absolutely condensed the pulmonary tissue, and was running on to abscess on her admission. And she was reduced to an extreme state of emaciation and weakness. So that a condition was present closely resembling tubercular consumption, and distinguishable from it only by the history. Yet the doubtful diagnosis gave me no anxiety, for it made not the slightest difference in the treatment of the patient, whose prescription-card made many of you set it down as an ordinary case of phthisis.

I cannot forbear here leaving for a few minutes the consideration of the cases immediately before us, in order to make a few remarks which possibly at some future time may cheer your hearts under chilling anxiety. I know of nothing more fearful than the feeling that upon your knowledge or ignorance depends the life of a fellow man. This feeling runs through, and ought to run through, your whole professional career; for the good of your patients your consciences cannot be too tender. But it is necessarily experienced in very different degrees in different cases, and in the present age you will find your anxiety generally turns upon diagnosis. The patients who make you dream and roll about in your bed of nights, and who spoil your appetite, are oftener those with whom you cannot find out what

is the matter, than those with whom you do not know what to do. Now, it is often a great comfort to reflect, and I am sure it is true, that where pathological conditions closely resemble one another in the symptoms they produce, the treatment they require is probably exactly the same. I should be sorry to "lay a flattering unction to your souls," but this is simply justice to yourselves. How often is it impossible to ascertain, without questions which it is impossible to press, whether certain diseases are due to previous syphilitic infection or not! Fortunately the same drugs are curative in both circumstances. How often do we reasonably fear to alarm a timid mind by inquiries into hereditary tendencies to lunacy or consumption! The cases are exceptional where these inquiries are absolutely necessary. And in this instance it made no difference in the performance of my chief duty, that of prescribing for the patient, whether those were right who thought the consolidation was tubercular, or those who thought it pneumonic.

The second attack of pneumonia happening under our eyes in the hospital, though hid from notice at first by its insidious manner of invasion, I cannot but attribute to the patient having got up and overworked her weak muscular powers. You may all be aware, from experience, how even in healthy persons unwonted exertion will cause temporary congestion of the respiratory tract. The stitch in the side and shortness of breath after running are well known. If we take violent exercise during catarrh, the mucus is often stained yellow some hours afterwards. I have had hæmoptysis on the morrow of a hard day's skating at Oxford. In an injured lung this tendency is still more marked and hurtful. Consumptive persons often spit blood the day after unusual exercise, although their hearts are quite sound. There was, then, nothing more likely, than that this aged woman should get congestion from the same cause, and nothing more likely than that it should run on rapidly to consolidation in her weak state, and with her antecedent tendency to degeneration. It is a warning to us to be more careful in watching over patients, and in avoiding everything which tends to exhaust the failing life.

The degenerative tendencies made evident by the state of the

kidneys, liver, and heart, rendered the renewal of life very unlikely in this case. But that is nothing against doing our best. Patients as much degenerated as that often go about for years, and with extreme care may sometimes be brought round from apparently fatal illnesses.

III. William W., aged thirty-seven, a post-boy, was admitted April 15th, with extensive anasarca and some fluid in the pleura, arising from Bright's degeneration of the kidneys. He was treated with sesquichloride of iron and hot-air baths. The dropsy diminished a little. On the 23rd he got chilled by an open window, and on the 24th the dyspnœa increased very much, his previously sero-mucous expectoration acquired rusty brown colour, and there was extensive fine crepitation in the lower lobes of both lungs. He was cupped between the shoulders, and a small quantity (six ounces) of blood taken. A jacket poultice was kept round his chest, and he took ʒss of ether, and ɱx of chloric ether every three hours, and four ounces of gin daily. The dyspnœa was somewhat alleviated by these means, and on the 27th the sputa became gradually purulent, instead of rusty. On the 29th it was still more purulent and copious. With the increased dyspnœa, induced by the attack of pneumonia, the anasarca of the arms, chest, and upper part of the body generally had very much increased.

In this man's case the imminent danger arising from the pneumonia has indeed almost passed away, and the increased dropsy of the upper extremities, arising from the extra impediment to the passage of blood through the lungs, is alleviated; but I fear that his broken state of health forbids our hoping for his final recovery. You may remark, however, that alcoholic stimulants, which certainly do not benefit albuminariacs in general, are here well borne and decidedly beneficial while the pneumonia is acute, and that they have sustained the patient while ready to perish. They have also not produced any tendency to coma (which is so much to be dreaded in these circumstances), but have aided restorative action.

This person had hardly a spark of life to spare, so as to allow of bloodletting to any extent, and it was only the imminent danger of death by congestion that induced me to employ the cupping.

[The man died towards the end of May of gradually increasing dropsy in all the serous sacs and anasarca. The pulmonary tissue at the back part of both lungs was scarcely crepitant. But it was not dark and congested, as is usual in cases of dropsy. It was mottled with yellow, as if it had been solidified by the pneumonia and were recovering. The kidneys were mottled and granular, not shrunken. His case is again alluded to a few pages on.]

IV. George P., aged twenty-seven, a coachman, was warded on April 14th. He had had a cough for four days. On the 13th had felt very ill, and in the evening of the same day an eruption of measles came out. His nose had been bleeding a little. His tongue was pretty natural; the pulse 88; the respiration 32 in a minute. There was fine crepitation without dulness, on percussion beneath the right scapula. He was ordered ten leeches beneath the right scapula that day, and ten the next, and a half-jacket poultice. He drew his breath much more easily after each application of the leeches. Dulness on percussion in the affected part, which was noted on the 16th, had disappeared on the 18th, and he took quinine till he left us on the 30th, the dulness gradually merging into moist crepitation of return. His cervical glands swelled as the eruption went off, and he had half a dozen leeches and hot fomentations to that part.

Here, contrary to what I remarked in the last case, there was plenty of life and vigour. Very probably the man would have got over his pneumonia well under any circumstances, but the leeching certainly relieved his deep pain in the side (the stitch of congestion) and I think it made things more safe. For in measles the pneumonia is the variety conventionally named "catarrhal pneumonia," that is to say beginning with and arising from bronchial catarrh, and is very apt to go on spreading. It does not come on as it were with a gush, and involve at once at the pulmonary tissue it is going to involve, but creeps onwards from lobule to lobule in a troublesome manner, unless checked.

This is familiar enough to those who have much to do with measles, but I do not think I had an opportunity of remarking

it to you before, because we so seldom have an example of that disease in the hospital wards. Occurring mostly in children, and being in them a malady of small moment unless complicated with pneumonia, it is rarely admitted into a general hospital.

The swelling of the cervical glands is common in all zymotic diseases, and had nothing to do with the pneumonia.

V. Samuel F., aged twenty-eight, a labourer, was seized on April 11th with a stitch in the right side and dyspnœa. I saw him on the 14th. There was fine crepitation and comparative, but far from absolute, dulness on percussion in the lower half of the right lung. The expectoration contained some streaks of blood, and was a little yellowish. He had previously six leeches on his side. I ordered him sixteen more and a jacket poultice. On the 16th the expectoration was rusty, and his nose had been bleeding. His bowels were open for the first time since his illness. His pulse was 104, and soft. He had had delirium on the previous night. His tongue and hands were tremulous, and the tongue had a yellowish tinge like that produced by chewing tobacco, which however he had not been doing. He was ordered ℿx of laudanum every four hours and six ounces of port wine daily.

By the 22nd the crepitation of return was heard, though the expectoration continued to exhibit a yellowish tinge mixed with the pus of which its bulk consisted. He was ordered quinine, mutton chop and porter in place of the laudanum and teacup diet.

On the 29th, cough and expectoration had ceased.

Here the opiate treatment of pneumonia was adopted. I think it especially suited to cases where there is evidence of deficient power in the nervous system, where there is great prostration or tremor of the hands and tongue. Where also the tongue has a smooth whitey-brown-paper coloured coat. I give it also where there is diarrhœa, or even any tendency to diarrhœa, such as two fluid motions daily, in pneumonia: for of all unfortunate complications there is none so bad as looseness of bowels: those patients always do best who are constipated either naturally or artificially.

When in consultation you are obliged to defer to the opinion of others, and give either mercury or antimony, especially the latter, in pneumonia, always make a proviso that a good dose of opium shall be joined; it prevents a great deal of the harm which normally results from the use of those drugs.

It is remarked several times in the note book that no drowsiness was produced, although the opium was given to the extent of three grains daily. This is characteristic of the action of opium in acute inflammations, when it proves beneficial. If the normal effects of the drug is fully manifested, I have not found that it has agreed so well.

You will find it remarked on the 18th that the pulse was "reduplicating." This is rather an awkward attempt to translate Galen's term δίκροτος, a character of arterial beat graphically compared by him to the stroke of a hammer brought down loosely on an anvil, which rebounds and so gives a second little stroke afterwards. It seems he often found it in the malarious fevers of southern Europe, and observed that it indicated an approaching crisis. I should think that very probable, for it seems to me to arise from the renewal of the natural course and force of the circulation, when that retum to health is associated with weakness of the cerebro-spinal system—when the restored strength of the muscular tissue is not supported by a corresponding renovation of nervous function. It is an indication for the use of alcohol and opium, I think, although I have not observed it long enough to be sure.

VI. Jane W., a young wife, the mother of one child, and six months pregnant with her second, was admitted April 12th. She had been quite well in the morning of the previous day, till she was taken with sickness and cold shivers at 9 a.m. Between 12 and 1 pain came on in the left side accompanied by dyspnœa. She was treated with sixteen leeches, in two detachments, to the left side, jacket poultice and hydrochloric acid. On the 14th the case was identified as one of pneumonia by fine crepitation in the whole lower half of the left lung with very slight comparative dulness on percussion, and she was put upon a grain of opium every three hours. The next day no sleepiness having been produced by the opium, and the tongue being yellowish, white and pasty, she was put upon wine, but it seemed to

produce vomiting, and was left off next day. The crepitation was succeeded by absence of breath-sounds and increased dulness. On the 21st crepitation (of return) was heard, the appetite returned, and she was put on quinine instead of the opium. She was discharged cured on the 22nd. The vomiting, due partly as it seemed to her pregnancy, did not recur.

There is nothing particular to be remarked in this case respecting the pneumonia and its opiate treatment, beyond the fact of the advanced pregnancy, which seems to have offered no impediment to its success. You may observe that wine in a young person unused to stimulants produced vomiting, which ceased on its omission after the trial of a few glasses. Vomiting in pregnancy is very often the consequence of persistance in taking alcoholic drinks. Alcohol is familiarly known to be an emetic when swallowed in excess, and in the sensitive state of the abdominal and thoracic nervous system which accompanies pregnancy, a very small quantity is in fact an excess, so far as this effect is concerned. Foolish women, feeling what they term "weak" from the extra weight of body they have to carry during pregnancy, and perhaps also glad of an excuse for indulgence, sometimes take an additional quantity of wine or beer at this time, and are punished by troublesome vomiting. This can often be checked at once by making them leave off the stimulant, and take only light digestible food in small frequent quantities.

You may remark that she was put upon hydrochloric acid for a couple of days. This was on her first admission, when the prostration, more than usual in single pneumonia, and caused probably by her journey to the hospital, made us suspect typh-fever. However, absence of delirium, of cutaneous eruption, and of any other signs of that fever, set the question at rest very soon, and fine crepitation in the pulmonary tissue pointed out the true disease.

(*Clinical, St. Mary's, May 30th,* 1863.)

I shall resume the subject of pneumonia with a few additional cases.

VII. Elizabeth M., a girl of sixteen, was taken ill on May 23rd, with drowsiness, nausea, vomiting, pain in her back and limbs, and in short the usual symptoms of typh-fever. On her admission, two days afterwards, these were more decided, and the tongue was dry and brown in the centre. But there were no fever spots, nor have any appeared since. She had some diarrhœa on admission, and there was pain on pressure of the left iliac fossa. On examination of the chest we found fine crepitation and slight comparative dulness in the left lower lobe, and this has since extended in a minor degree to the right lower lobe. On further examination we found also a valvular murmur with the first sound of the heart on the left side of the apex, very local and scarcely heard at the centre of the heart, probably due to valvular disease from an attack of acute rheumatism two years ago.

The only additions made to the usual treatment of typh-fever were six leeches beneath the shoulder-blade, a jacket-poultice, and ten grains of compound kino powder three times during the first day.

This case is distinguished by the very early occurrence of pneumonia in typh-fever. It is not a mere congestion from the long gravitation of poisoned blood in the sluggish tissue, according to the commoner history of such accidents; but it began the first day or the second day of the disorder. The probable explanation of this is the imperfection of the girl's heart, by which the circulation was more than ordinarily retarded. Observe how latent the pneumonic symptoms are: they came on quite unawares to the patient or her friends, and the lesion was made evident only by auscultation. It is usually so in typh-fever; for the normal sensitiveness of the system is blunted by the poison, which by its effects might almost be called a narcotic poison, only that it does not produce true sleep. This is a

warning to be very industrious in not neglecting the use of your ears in all cases of typh-fever.

The compound kino powder was ordered for the purpose of putting an immediate stop to the diarrhœa. The hydrochloric acid would have done that gradually in twelve or twenty-four hours, but a purged state of bowels is such a pernicious circumstance in pneumonia, that I was in a greater hurry than usual to arrest it.

VIII. Timothy MacC., a burly hard-drinking brickmaker, about twenty-seven, we found in bed May 27th. He was too ill to tell a consistent tale, but he stated that he had been quite well till the 22nd, when, on getting up in the morning, he was seized with a trembling so severe that he could hardly dress himself, and was nearly two hours trying to do so. These "trembles" continued on admission; he could not hold his hand out straight, and said that when alone he saw flocks of sheep scampering past and shadows of persons not really present. He had a hard bad cough, and his sputa was rusty and copious, with pus in it. On the right side of the chest, both in front and behind, there was a diminution of vocal resonance, dulness on percussion, ægophony, and coarse bronchial breathing. On the left side there was dulness on percussion in the lower lobe behind, bronchophony and coarse râles. In the front of the same side there was puerile respiration. There was also stitch in the side and plueritic friction on both sides. The respirations were twenty-four, the pulse 112 in a minute.

He was ordered ten drops of laudanum in effervescing ammonia draughts three times a day, jacket-poultice, teacup diet, and eight ounces of port wine daily.

On the 28th the pulse was 120, the respirations forty-two. He was very delirious. A pint of bottled stout was ordered in addition to the wine.

He died early on the 29th—two days after admission. No post-mortem examination was allowed by the friends, who carried off the corpse directly.

This is a case of that severe form of pneumonia which not uncommonly comes on as a consequence of delirium tremens

in hard drinkers much exposed to the weather. The nervous symptoms are, in proportion to their prominence, an unmistakeable warning to avoid depressants and to keep up the patient's strength by all the means in your power. Bleeding such a man would probably kill him in raving mania, and I would not venture even to cup or leech him, useful as it would probably be to such a state of lung in a temperate strong person. Alcohol must be given without stint; but yet I fear that however active and unsparing your hand may be, you will still lose the greater number of your patients who have pneumonia come on in the course of delirium tremens.

IX. George F., aged twenty-three, was attacked on the 3rd of May with rigors, and about four hours afterwards felt a severe lancinating pain in the right side, much increased by inspiration. He was sent up to bed as an urgent case in the evening, with great dyspnœa, a short sharp pulse, and dulness on percussion in the lower part of the right thorax. It seemed to be a case of pleurisy, and the house surgeon put him on mercurials and salines, and applied leeches to the painful part. On the 6th the sputa became tawny and specked with blood. At that date, although the dulness on percussion was less marked than on admission, it was still present, but all over the infra-scapular region on the right side and partially on the left, there was fine crepitation. He was then enveloped in a jacket-poultice, and given seven minims of laudanum every three hours. On the 9th the pneumonic sputa was still more strongly marked, and he was ordered, in addition to the opium, tincture of bark and ammonia and port wine. Two or three days after we found the respiration quite absent in the lower lobes, though there was large bronchial breathing. But on the 16th crepitation began to return on the right side, and on the 18th some on the left side too—a joyful sound! By the 20th it was well marked and clear on both sides, and I thought myself justified in ordering him ordinary diet and porter, though the sputa was still mixed, tawny, and purulent.

Since then he has been steadily convalescing with the assistance of a blister to the right side, where he felt some pain, and yesterday got up and partially dressed himself.

There are two directions from which pneumonia attacks the lungs; it begins either from the inside, that is the bronchial mucous membrane, in which event it constitutes catarrhal pneumonia, or the "suffocative catarrh" of our forefathers; or from the outside, when it may be fairly named pleuropneumonia. The latter is exemplified by the present case. I should say that, as a rule, the chief danger of catarrhal pneumonia was at the first onset of the illness, when it sometimes ends very rapidly; while pleuropneumonia causes about an equal degree of danger throughout, till convalescence begins. And convalescence is generally in such cases very slow, the destroyed pleura not allowing the restored lung to expand freely so as to dilate the air-cells. The tissue, therefore, is apt to remain condensed.

I dare say you wondered to see me order to a man, whose lungs were in such a state as to cause dulness on percussion and crepitation, beef and porter like a labourer at work. But I reckoned that where there was vitality enough in the system to cause so quickly the returning sound of expansion, there was vitality enough to digest normal victuals. I do not say you can always succeed in getting solid meat digested thus early, but where you can, it shortens the convalescence very much.

The mention of returning crepitation after pneumonia induces me to recall to your recollection a post-mortem examination which took place a fortnight ago on a patient about whom I lectured on May 2nd, William W., who died of anasarca from diseased heart and kidneys, in the course of recovery from pneumonia. I say "in the course of recovery," because the pulmonary tissue had again become partially crepitant, and the sanguineous expectoration had ceased. After death we were able to see what pathological condition these signs indicated during life. The tissue of the back part of each lung was barely crepitant, but it floated in water and admitted some air. It was mottled, as if measle-spotted, with yellow and red: on pressing it hard a small quantity of thick fibro-purulent stuff could be squeezed out from the yellower portions, but the others seemed quite empty.

I have no doubt in my own mind, that the way in which consolidated lung recovers, is by the exudated fibrin breaking down into pus and being expectorated, whilst the obstructed

air-vesicles regain their elasticity and capacity for performing their functions. This is a strong argument for an ample supply of nutriment during the regenerative process.

You may have remarked, both from the progress of this patient, who is slowly recovering, and from the post-mortal appearance of the lungs in the one who died from other causes during convalescence, that pneumonia is not a sudden attack, which strikes at once all the pulmonary tissue that is going to be affected. Its onward march is gradual; it creeps on from spot to spot, and from lung to lung. And its backward march is gradual too; the parts first paralysed in their functions recover first, and those last wounded recover last. This too they do, in spite of the latter being perhaps the least affected.

It is from observations like these that the great advantage of our port-mortem examinations is derived. The chief cause of death is often the least note-worthy fact about them. In nine cases out of ten it is some utterly irremediable organic lesion, the sight of which merely flatters your vanity by verifying your diagnosis. But the lesions which do not kill, and which are curable, are those you are concerned with, and to understand which makes you good practitioners.

(*Clinical, St. Mary's, July* 11*th,* 1863.)

George F., about whom I lectured to you six weeks ago, has justified by the slowness of his convalescence the distinction I pointed out to you, between pneumonia commencing from the interior of the lung and from the outside. The lower right lobe still remains dull on percussion, and air is very sparingly admitted into it. Some parts of the pulmonary tissue has also broken down into a small abscess in the front part of the lower lobe. He has fortunately no hectic, and is getting strong and stout slowly upon iodide of iron and cod-liver oil. The ribs will probably fall in on that side just as they do after empyema, but we shall not be able to keep him in the hospital long enough for you to see this result.

Two other cases of pneumonia were taken in yesterday week.

X. Mary P., a child just at the age of puberty, was admitted July 2nd. She had had cough and cold for a short time, but did not give up her work as a domestic servant till the morning of her admission, when she was taken very ill, with shortness of breath. On admission the breathing was very laboured, and she raised the alæ nasi in inspiration. The respirations were 44 in the minute; the pulse 144. There was bronchial breathing and whistling râles all over the chest. The whole of the right lower lobe was dull on percussion. No stitch in the side, or pain on pressure. She was cupped to ʒiv between the shoulders, eight leeches were applied beneath the shoulder-blades, and the chest was enveloped in a jacket-poultice. I also ordered her ɱx of laudanum every three hours and tea-cup diet.

On the 4th, when I came round, she was asleep, and the respiration was evidently so much relieved that I did not care to rouse her. She had expectorated some blood-stained mucus.

On the 5th the pulse was 130; the respirations 36.

On the 8th the pulse was 120; the respirations 26. The dulness, on percussion, extended half way up the right lung, and coarse crepitation had succeeded to the whistling râles. The tongue was brown; but that did not seem caused by any aggravation of the symptoms. On inquiry, I found she had been sleeping that night and morning much more than usual, and suspected that the brown coat of epithelium was caused by the opium. I left off all drugs, and trusted to the poultice only.

On the 9th her tongue was clean.

To-day (the 11th), the respirations are natural, and the air enters freely to the base of the lung, which is resonant on percussion. Only on a full inspiration can you hear a little crackling in the pulmonary tissue. The sputa is purulent, with a slight orange tinge in some specimens. She says her bowels have not been open the last six days. She makes so much of this observation, that I have given her a dose of castor-oil, to quiet her mind.

Remark in this girl how severe the symptoms were at first, how dangerous indeed to life, yet how soon the alarming part

of them passed away. This would not have been the case if she had had pleuritic pneumonia, instead of catarrhal or bronchitic pneumonia.

The opium agreed with her very well, but ten drops every three hours is a large dose for a child; and, therefore, when it did not seem to be demanded by the symptoms, I was glad to leave it off. You will usually find that the time for doing so is marked by tolerance of the drug ceasing, and increased drowsiness coming on.

Remark the constipation, and how well it agrees with pneumonic patients.

XI. George L., a muscular labourer, aged thirty-two, came under my care July 3rd. He confessed to being a hard drinker, and to having had several attacks of delirium tremens. After ailing for a few days to such an extent only as allowed him to go on with his work, he was taken on June 30th with rigors and dyspnœa, so as completely to prostrate him. When I saw him the respirations were 60; the pulse small, 140; his tongue thickly coated. The skin was hot and dry, and there was an eruption of herpes on the lips. There was dulness on percussion, with bronchial breathing, in the whole of the right lower lobe, and dulness less decided in the lower part of the left lower lobe, with fine crepitation at the upper level of the dulness. He was cupped to ʒviij beneath the shoulder-blades, put in a jacket-poultice, and ordered twenty minims of laudanum every four hours, and tea-cup diet every two hours.

On the 4th the pulse was 130, larger and fuller; the respirations 44.

On the 5th the pulse was 120; the respirations 40. I found him raised in bed and reading a newspaper.

On the 6th the pulse was 132; the respirations 36. He had been noisy and delirious the night before. Four ounces of port were ordered to be added to the treatment, to be taken at night.

On the 7th tawny expectoration commenced.

On the 8th pulse 108; respirations 36.

To-day (the 11th), his pulse is 100; the respirations 26; the air enters freely into the right lower lobe, with only a certain coarseness on full inspiration. That part is also resonant on

percussion. In the left lower lobe a slight comparative dulness remains, and there are the crackles of returning breath sounds.

The lung tissue you see has returned to its allegiance in the order in which it ceased to work. First the right lower lobe, which was the most condensed on admission, and was the first affected; then the left lower lobe, which was the last to suffer, and is, therefore, the last to get well. Pneumonia does not strike like a thunderbolt the whole that is going to be injured, but creeps on from one spot to another, and creeps away in the same order.

The remark which I made in the last case as to the form of pneumonia, and the alarming earliness of its severe symptoms, applies equally to this man. Though his breathing was so short, and his pulse so quick on the 4th, yet on the 5th he had strength enough to be reading his Sunday newspaper. But the exertion was as bad for his body as the politics doubtless were for his mind, and in the evening he got delirious, and was inconveniently violent during the night. I had hoped to spare our wine, but was forced by this delirium to order him a couple of glasses of port to be taken every evening.

You may learn by this instance how important quiet is in pneumonia both for mind and body. Nearly all our dangerous and fatal cases are made dangerous and fatal by neglect of this; and though this patient is not seriously injured by his imprudent obstinacy, yet I have no doubt his convalescence will be the longer for it, and we have had to give him stimulants which might possibly have been spared. If the stimulants had not been given, he would very likely have had delirium tremens; the lungs would have become more congested, and he might have died like a man I lectured about on a late occasion. (See Case VIII.)

When I say this, however, I ought to guard my words. For in reality he would not have been in anything like the danger of that poor fellow. Truly enough the two diseases are a most perilous combination; but it makes a great deal of difference whether the pneumonia is a consequence of an antecedent delirium tremens, or, whether the delirium tremens is a con-

sequence of the pneumonia coming on a predisposed subject. In the former case a fatal result almost invariably happens, but not so in the latter. So that though he might have died, yet he would not have been so certain to die as our former patient.

XII. A little boy, four years old, was conveyed here on the 3rd instant, just at his last gasp, and died about a quarter of an hour after I had seen him, whilst the sister was putting him into a poultice, and giving him some wine and beef-tea.

It was entered in the "urgent admission book," as a case of pneumonia; and so there was pneumonia, but it had nothing to do with his death, which in reality arose from the impaction of a calculus in the right ureter and inflammation of the kidney following thereon. The pneumonia was a consequence, not a cause, being of the sort fairly designated "pneumonia *morientum*." It was the consolidation of scarce a half of the right lower lobe by this congestion of gravitation which caused the patient to be entered as I have said, and placed in the medical wards. Had that been the only anatomical change this child might easily have recovered; and I mention the case, only to guard you against crediting the death purely to pneumonia.

The dozen cases of pneumonia which I have made the subject of a considerable portion of three clinical lectures since Easter,* may be held to be a fair representation of an average four months hospital experience of the disease. There have been specimens of its most ordinary forms very much in the proportions in which they will occur to you in practice. They have included

2 cases of pleuro-pneumonia, one fatal, one not; (VIII, IX).
1 case of pneumonia in measles; (IV).
1 case of pneumonia in typh-fever; (VII).
1 case of pneumonia in Bright's disease; (III).
1 fatal case of pneumonia relapsing on a previously consolidated and broken down lung; (II).

* Viz., on May 2nd, May 30th, and July 11th. They are here massed together into one lecture.

5 cases occurring in previously healthy persons; (I, V, VI, X, XI).

1 case occurring as a complication of the death-agony from another disease; (XII).

In the fatal cases the death was caused in one by the pneumonia coming on a previously consolidated lung (II), in the other on a severe attack of delirium tremens (VIII). In the third the pneumonia was caused by the death (XII).

And as to treatment I have taken current opportunities of impressing upon you the following rules:—

I. Take blood locally, cautiously, in the early stage only, and with a distinct reference to the power of each patient.

II. Keep the chest from first to last enveloped in a jacket-poultice, and allow of as little movement as possible.

III. Administer food frequently, largely, and in a liquid form.

IV. Where the nervous system is deeply smitten, as indicated by tremulous muscles, mental excitement, delirium, tawny tongue at an early stage, great depression, &c., give opium; and in some cases give alcohol, but not in small repeated doses.

V. Where there is diarrhœa, stop it immediately with opium or kino.

VI. Consider antimony, mercury, and purgatives as poisons in pneumonia.

I have heard the plans of treatment which I recommend you to adopt described as "trusting to nature;" and sometimes a deprecatory "merely" is added—"merely trusting to nature." In one sense this is true, for all methods of cure, at least all successful methods of cure, must depend on the regaining of natural vital forces; and the agencies brought into action by our interference must be the natural vital forces of the body acted upon. The heat and moisture, for example, which we employ in pneumonia, are an imitation of and compensation for the deficient steadiness of the vital warmth; the current of blood which we cause to flow with our cupping glasses is a replacement of the natural current; we give opium to bring the condition of the nervous system into harmony with the functions arrested by the

disease. There is no successful method of cure but what is successful by virtue of thus restoring vitality. But in the sense intended by those who slightingly use them, the words are synonymous with doing nothing, or leaving the patient to himself, with *la médecine expectante*, with the *contemplatio mortis* of the satirist, with a hardened scepticism. It is a saying like those clever sneers of Job's adversary, which, under the guise of a truism, hide a lie.

Doing nothing or leaving the patient to himself, would indeed be dishonest; but do we do so? Is it doing nothing to keep up constant relays of poultices night and day for a week or ten days? Is the enforcement of continuous nutrition no labour? Is there no anxiety and thought expended in hourly watching the need of variation in our doses of opium and wine for serious cases? Is the moistening and warming the air to an even temperature not enough to occupy our time? Is it so much easier to support the waning life than to weaken it, that the former should be condemned as idleness, the latter praised as activity? If the pneumonic patient were left to himself would he—could he—adopt any of the means suitable for his recovery? Would he not very likely be taking colocynth, senna, calomel, antimony, ipecacuanha, salines, senega, squill, hydrocyanic acid, colchicum, be rubbing in mercury, applying mustard poultices and blisters, be bled *coup sur coup*, or have brandy every half hour? Is it nothing to stand sentry against the fatal seductions of poly-pharmacy?

LECTURE XXII.

EMPHYSEMA OF THE LUNGS.

Illustration of the morbid anatomy of emphysema—Fatty degeneration of the pulmonary membrane—Degeneration sometimes fibroid—Cause of the proneness of children's lungs to become emphysematous—Question whether inspiration or expiration most tends to produce emphysema—Action of the lungs in breathing illustrated by an example of a man without a sternum—Expiration more powerful than inspiration—Application of the morbid anatomy of emphysema to clinical questions—Case of emphysema in an albuminuriac—Case of emphysema depressing the heart—Treatment and its objects—Iron—Tobacco—Lobelia—Stramonium—Mercury—Alcohol—Expectorants—Two cases of emphysema in young women exposed to adverse circumstances—Treatment by iron—Trial of expectorants.

(*Clinical, St. Mary's, March* 13*th*, 1863.)

The following case, of which you now see the post-mortem examination, is a fair illustration of the morbid anatomy of pulmonary emphysema.

Of the diseases which the deceased had suffered from dependant on this condition the history was given by him as follows :—

George W., aged forty-two, a temperate labourer, much exposed by his work to cold and wet, had always "a good wind" till three years ago. Since that time he has been what he terms "asthmatic," that is to say, he has been habitually short of breath and liable to contract catarrh accompanied by dyspnœa on moderate exposure. He was still always able to do

an average day's work till last Christmas, since which time he has been too short of breath. He cannot assign any cause for his illness except exposure to cold.

When you first examined him, March 2nd, he was breathing spasmodically and with extreme difficulty; his lips and face were dark purple, but without any of the bloated appearance you so commonly see in cases of dyspnœa from enlarged heart. On examining the chest we found the cardiac region, as well as the whole lower part of the thorax, preternaturally resonant, and the ribs were bowed and raised, so as to make the bony framework of the upper half of the trunk more globular than natural, and to throw backwards the lower angle of the scapula. The intercostal spaces were not protuberant. The number of respirations was thirty-four in a minute, the pulse 104. In the cardiac region, and in several other of the lower parts of the chest, I drew your attention to a peculiar crumpling sound in inspiration, not unlike that produced by squeezing up fine paper in the hand.

He experienced a certain degree of relief from the rest in bed, and a draught three times a day containing lobelia and chloric ether; so that on the 4th his respirations were reduced to twenty-eight in a minute.

But he soon fell back again, and sank exhausted and breathless on the 11th, and we have now to make the post-mortem examination.

On opening the chest the heart is seen completely overlapped and hidden by a layer of lung about two inches thick, consisting of lobular masses of pulmonary tissue, pale in tint, dilated into vesicles, and looking more like flesh-coloured soapsuds than anything else. These masses of vesicles are firm and elastic from retained air; but when that is let off by a puncture, they sink down into a flabby non-crepitant substance. The same appearance is seen in the greater part of the lower left lobe, and at the apex of the upper lobe; and the lower right lobe is partly in a similar condition. The flesh of the heart is pale, and its cavities are large. The wall of the left ventricle is thinner perhaps than natural, but the whole organ is not so much dilated as to render the valves inefficient; and they are healthy in appearance. The kidneys and other viscera are quite normal.

On the whole you are perhaps rather surprised at the small

extent of obvious organic change, considering the violence and fatality of the symptoms. But now examine again the portions of lung not affected with these bullæ of emphysema. They are doughy, flabby, and non-elastic. They keep the mark of a finger pressed upon them. They are very slightly crepitant when squeezed. You may reasonably feel doubtful whether such pulmonary tissue can perform the functions which require elasticity and firmness.

Now let us make a section, and cut out with a pair of curved scissors a few snips as fine as we can, tease them out with a needle, and place them under the microscope with a lens of one-quarter inch focus. You thus get a sight of the pulmonary membrane. You know it ought to be a continuous skin-like membrane, transparent, and distinguished principally by bundles of fibres gently curled and interlaced. In a healthy lung it does not exhibit any cells or corpuscles. But here you see scattered about it numerous fine dark specks, and somewheres there are round bright globules with a dark outline, and somewheres the globules and specks are collected together into masses, denser towards the centre—so —just like the masses of fatty degeneration which you have in the muscular structure of atrophied hearts. This is an example in fact of the same morbid state in another tissue, the fatty degeneration of pulmonary instead of cardiac tissue.

You will easily understand how emphysematous bullæ arise. Melt one side of an india-rubber ball in a candle and squeeze it; you see it bulge out into a bubble just in the same way; and just from the same cause, loss of elasticity. What the melting is to the india-rubber ball that to the pulmonary branch of vesicles is the wasting of its elastic web into fat. When any dilating force is exerted upon the walls of the vesicles they give way and do not contract again.

It is not always fatty degeneration which is found in emphysematous lungs; sometimes it is fibroid degeneration, and Dr. Jenner has in his experience found this latter the most common.* Either sort of partial interstitial death involves a loss of the functions of elasticity and contractility in the tissue—fatty

* 'Medico-Chirurgical Transactions,' vol. xl, p. 26.

degeneration probably the most loss, and therefore it is that you find it in the most rapidly fatal and most marked cases, such as the one under our eyes. The same softness and proneness to give way may also be supposed to exist in the lungs of children; for the younger the tissue the softer it is; and thus children's lungs are very prone to become emphysematous without there being any interstitial change to be detected in the pulmonary tissue.

The anatomical or predisposing cause of the disease we are considering may then be held to be a too great softness of tissue, from the lung either not having yet acquired its full power of resistance, or from having lost it by morbid change.

And now let us look for the external or determining cause, quite as important an element in the production of disease. It is the act of breathing of course, and the act of breathing forcibly, that breaks down the over-soft tissue. But is it inspiration or expiration that is most to blame, or both equally? The question rests on the point of which causes most pressure of air on the pulmonary membrane of the air cells. And because inspiration fills these air-cells, it has appeared to some to cause most pressure on their walls. Doubtless in inflating a bladder you increase the atmospheric pressure on the inside, and I suppose it must be this analogy which has led physiologists astray. But the cases are quite different; the lungs are not inflated by blowing air into them, but by the expansion of their walls drawing air into them, in fact by the atmospheric pressure on the interior being forcibly lessened through the action of the diaphragm and other respiratory muscles. A fairer analogy would be a pair of bellows, the leathern sides of which are certainly not bulged outwards by the filling of the instrument. And if that leather was softened it would swell and stretch during the blowing of the fire, not during the drawing in of the air.

Not inspiration, but expiration, must be the most efficient determining cause of the dilatation of the air-vesicles in emphysema. The difficulty which people feel in understanding this arises from their thinking of the thoracic walls as a contracting ball or box, of equal contracting force throughout, and which therefore in its contraction during expiration would

equally diminish the area of all the pulmonary vesicles at once. And diminishing the area, say they, is certainly inconsistent with dilatation. But this idea of the chest is an erroneous one. The thoracic walls, from their irregular shape and from their varying solidity in various parts, press with a very unequal degree of force on different parts of the lungs. The apices of the upper lobes for example, from the deficiency of the bony framework above them, and the edges of the lower lobes from being in an angle, escape the compression of the ribs and diaphragm to a great extent. When then the air by the action of the respiratory muscles is squeezed out of the more readily compressed parts, it is driven into or at least is driven towards these less compressed parts.

Two or three years ago some of you were shown in this theatre the action of expiration upon the less compressed parts of the lungs by a M. Groux, a poor gentleman with a congenital deficiency of the sternum and a consequent fissure in the thoracic walls, which fissure was covered only by skin and cellular tissue. Of course the portions of lung behind this fissure were less compressed than any part of the pulmonary substance; and during expiration you saw them bulge out, just like the leathern sides of a bellows during a corresponding movement. Those who witnessed the curious sight admired the toughness of pulmonary tissue which could resist injury from such an abnormal state of things. And they could not fail to understand that if M. Groux's lungs had been wanting in elasticity, they would never have been able to resist the dilating power exerted by expiration on this undefended part of the tissue. The same condition which M. Groux's deficiency of sternum exhibited in an exaggerated way, the normal partial deficiency of bony framework presents in a less degree to the apices of the lungs, and their peculiar angular position to the bases. It is in these parts that expiration causes the atmospheric pressure to be greatest, and it is in these parts that emphysema most commonly appears, as exemplified in the instance before us. It is at the apices and anterior edges of the lungs indubitably that we most often find this morbid state when the degeneration is generally diffused.

When emphysema appears elsewhere in the lungs, the apices and edges being free from it, it is due to the degeneration being

local, and to those peculiarly liable parts at apices and bases being shielded from injury by their healthy elasticity.

Another reason for thinking that expiration rather than inspiration is the main cause of the final injury to the vesicles in emphysema, is that it is much the most powerful of the two muscular efforts. If a man can draw in the air through his nostrils* with sufficient force to raise a column of mercury (say) two inches, he can by expelling it steadily raise the level 2½ inches: if he is strong enough to lift the fluid by inspiration 2½ inches, his expiratory power will mark 3½. Thus, even though it is possible that both inspiration and expiration may tend to rupture or dilate the pulmonary membrane, inasmuch as all motion must endanger an abnormally friable tissue, yet expiration tends to do so much the most. That is the real practical point, as I will show you presently, when I come to apply our knowledge to its true end, the relief of distress.

This fatal case then has shown you the true nature of the anatomical injury you have to deal with in emphysema of the lung. It is an interstitial partial death, or degeneration of the pulmonary membrane. This membrane, which forms the frame work of the vesicles, thus loses its elasticity and is determined to dilatation by the action of forced expiration.

It may be asked whether the degeneration is not rather the result instead of the cause of the dilatation. It may be suggested that bronchitis and violent cough originate the rupture of the vesicles, and that the ruptured vesicles, being unused, fall like all unused tissues, into fatty decay. I will not deny the possibility of such a sequence of events in some instances, because in point of fact we do find emphysema of unaltered pulmonary tissue in children. But it was not so in the case before us, because the patient had not been subject to bronchial catarrh, had no mucous secretion before he got short of breath, and indeed had very little even up to the fatal termination. And the case before us is a well marked type of uncomplicated emphysema in the adult.

* The nostrils must be used in the experiment, because the action of the tongue and cheeks in suction and puffing introduce a fallacy, bringing into use muscles which are not muscles of respiration. See Dr. Hutchinson's paper in 'Medico-Chirurgical Transactions,' vol. xxix, p. 199.

Do not rest satisfied with having learnt the pathology of a disease without applying the pathology to its treatment. If it were not capable of such an application I should not make it a subject for clinical lecturing. The pathology of emphysema shows us a gradually increasing loss of vitality in the pulmonary membrane. We must so treat the patient as to increase the vitality. A constant supply of nutritious food and long courses of iron give the best chance of doing this. I should have adopted it for our poor patient had he lived long enough.

The pathology may teach something more. Expiration is the dangerous and injurious part of breathing, and especially forced and arrested expiration. Let your patient carefully avoid all such employments as strain the respiratory muscles—all such labours as make a man hold in his breath and then puff it out with a jerk—such as lifting and carrying heavy weights, digging, pitching, rowing, &c. I do not think you need trouble yourselves about wind instruments or singing; persons with emphysematous lungs are not likely to be addicted to them, and as a matter of fact those who use the chest freely, such as public singers, do not get emphysema from the exercise of their profession. Of this latter fact I am certain—it is not the due use, not the "straining" of the pulmonary membrane which causes it to denerate, but rather the want of use. In this respect it resembles all other living animal tissues.

(*Clinical, St. Mary's, March 27th,* 1863.)

I will take the opportunity of having admitted, a week ago, two cases of pulmonary emphysema, to recur to our subject of a recent lecture.

"John D. is a poor street-sweeper now, and nearly seventy years old, but has been a gentleman's servant, has had "his beer regular," and taken it freely. This confession is corroborated by the shaking of his hands when he puts them up. He says he has been "queer and wheezy" and subject to frequent coughs for six years, and five years ago was under my care for asthenic gout. The cough is of a violent spasmodic character, and does not bring up much mucus. His chest is resonant and rounded,

and moves very little on inspiration. The cardiac dulness commences at a low level at the base of the heart, and the pulsations of the organ are felt in the epigastrium. His corpulence prevents us from getting the auscultatory signs of emphysema so clearly marked as one would wish. There is not now, nor does there ever appear to have been, any anasarca.

"The urine is albuminous, of the specific gravity 1·012."

In this case I think there is a generally distributed deficiency of elasticity in the pulmonary tissue, which has arisen from the same diathesis as the morbid state of his kidneys (shown by the albumen in the urine) and perhaps of other organs as well. But his general weak health, graphically described by him as "queer," has prevented his working hard, though I dare say he has lived hard and drank hard: and in consequence the determining cause which I explained to you fully, in my lecture a fortnight ago, of forced and impeded expiration, has not been present. Thus local spots of very marked emphysema are not found. The defective vitality of the renal tissue, which makes him an albuminuriac, is doubtless of the same nature as that in the lungs; and it causes a tendency in the blood to throw out its serum and thus to saturate the lungs with fluid, which assists also in concealing from our ears the signs of the emphysema present.

The prognosis is certainly favourable as far as his chest is concerned, but I fear we cannot make a young man of him.

The other case is the following:—

"George H., aged fifty-three, a plasterer, first became asthmatic two years and a half ago. After suffering a few weeks and expectorating a little mucus streaked with blood, he was admitted into the hospital under Dr. Sibson, and remained six weeks, having during that period had a carbuncle on his neck and an abscess in the left axilla. He went out relieved, and has been able to work ever since, in spite of his asthma, till a month before Christmas last, when he again was obliged to give up. On his coming under my charge, March 20th, he presented the usual marked signs of extensive emphysema of the lungs. His chest is rounded, and the lower angles of the scapula are thrown upwards and outwards. The left side of the thorax is larger and more rounded than the right. There is very marked

resonance all over it, including the cardiac region, and the heart is pressed downwards, pulsating regularly in the epigastrium; the valve sounds are healthy. The breathing is abdominal; the respirations are twenty-eight in a minute. The face is livid, and the lips blue, but without any of that bloated appearance so common in asthma from diseased heart. There is a good deal of frothy expectoration, but no blood streaks in it. The urine is healthy."

While examining this and some other emphysematous chests, I have been asked by pupils how it is that there is no bulging of the intercostal spaces, and I have been given to understand that bulging of the intercostal spaces is taught as a sign of emphysema at some schools. This is an error—the intercostal spaces do not "bulge," like as when the pleuræ are full of fluid, a fact which you may ascertain for yourselves now. But of course from the chest being always in a state of fulness, the ribs are widely separated from one another. This, however, is a very different thing from intercostal bulging, as you may see in both the dead and living body.

I have ascertained, by a reference to Dr. Sibson's case-book, that the signs and symptoms exhibited by this patient were much the same on his former admission as they are now. He is not essentially worse, and indeed his trade is not one which with ordinary care and prudence would be an injurious one. The prognosis therefore may be favorable.

I will view as one the treatment of these two persons, inasmuch as I have ordered them both the same medicine, viz.:—

℞ *Tinct. ferri sesquichloridi* ♏*xx*,
Tinct. lobeliæ æthereæ ♏*xv*,
Mist. camphoræ ℥*j*,
ter die.

The object of the iron is to try and restore its full vital powers to the creative arterial blood, so that it may renew the pulmonary membrane, that it may form healthy elastic tissue, instead of the imperfectly elastic degenerated tissue. That places where the walls of the air-vesicles are broken away, and where bullæ exist instead of vesicles, should be filled up again with a new growth is, I fear, out of the question; but that

where the form of the lung substance remains perfect, where to the naked eye it is intact, and only under the microscope exhibits its incipient death, there I believe we need not despair of our restorative agent having a fair chance of success. The best restorative medicine is the healthy blood of the patient's own body, and to make that blood healthy is the most rational aim we can have.

To the iron I shall at a future day add, in the case of George H., cod-liver oil, as a means of affording a molecular base to the growth of new tissue. He is thin, as you see, and it will be readily absorbed by the intestines, and probably agree well with him. I feel more doubtful about oil in the case of John D., as he is so flabbily corpulent; but I shall try cautiously how he bears it.

You may have remarked that I refused the very urgent request of John D. for beer, which he said habit had made a necessary for him. I hope, if possible, to break him of the habit, for nothing is so injurious to degenerative tendencies as alcohol, and no form of alcoholic liquid so bad as beer.

No—I must make one exception to the bad pre-eminence of alcohol, that is, mercury. Avoid mercury in these cases as you would a poison. Avoid also purgatives.

The lobelia is ordered as a substitute for a more powerful medicinal agent, tobacco. Nothing calms the distressing asthma so well as a few whiffs of strong Virginia. But to allow smoking in the hospital would lead to breaches of discipline; so I order that which is apparently the next best thing. Like tobacco, lobelia is a very variable article; there seems to be as much difference between one specimen and another, as between the mildest cigarette and the strongest shag. This accounts for what we read of enormous doses being sometimes perfectly inert, and of much less quantities having acted as a poison. A further safety to those who have taken large doses lies in the fact of its being, like tobacco, an emetic, and so freeing the stomach of its presence in excess. I should advise you to use the strongest sort, paying the best price at the best shop, so that you may give it in moderate and graduated doses. Lobelia does not disagree with the digestion like opium, and you need not on that score abstain from its use.

Another agent of the same character as tobacco is stramonium. It also is best administered in a pipe, but here again the hospital discipline interferes, and I am obliged to give it him in pills made with the extract, which you may see are not so efficient in this instance as the lobelia, though in the form of smoke it is often more useful.

Perhaps some of you may doubt whether it is quite wise to diminish by calmatives the action of the respiratory function, and may think the asthma an effort of nature, ordained to accompany emphysema for a beneficial purpose. This is a case in point very subversive of the theory of disease being an "effort of nature." The forced breathing, nay, even the natural breathing, tends to dilate the vesicles, and if it were designed to benefit the patient, we should have to conclude that the design was erroneous—a conclusion repugnant to instinctive reverence.

When there is an unhealthy condition of the mucous membrane of the trachea and large bronchi, evinced by copious expectoration, you will find benefit from cantharides or turpentine, either administered by the mouth, or applied to the surface of the chest in the form of blisters and rubefacient embrocations. These drugs often act very powerfully as restoratives of healthy action to diseased mucous membranes. They indirectly in this way benefit the emphysematous lung, by preventing the necessity for so much coughing; but they are not directly useful to the tissue mainly at fault.

I do not approve of the use of squill or ipecacuanha, and still less of antimony. Even if they appear to relieve for the moment, which is by no means generally the case, yet they lower the appetite and the powers of digestion, and thus stand in the way of active restorative treatment in emphysema.

(*Clinical, St. Mary's, October* 31*st,* 1863.)

There have been under your eyes during the month two cases very graphically illustrative of the pathology of emphysema.

On October 7th there was received from the Servant's Home (where she had been living, while attending as an out-patient), Annie C., aged seventeen, a fat but stunted maid of all work.

She was in the hospital during the summer of last year, and I find that her illness then was a typh-fever, slight in itself, but which had come on during a wet and cold foot-journey from Norfolk, and which had, under the adverse circumstances of its supervention, caused pneumonia of the lower lobes. She recovered perfectly to all appearance both the use of her lungs and her flesh at that time. But yet she says she has never quite ceased to suffer from shortness of breath. This shortness of breath has been gradually growing upon her, and prevents her keeping any place as a domestic servant. On admission she was very blue in the lips and face, and was suffering great dyspnœa; the respirations being forty in the minute. She said she had not been able to lie down in bed for two months. There were loud snoring and cooing râles throughout the lungs, interspersed with occasional cracklings in various parts, a roundness of the thoracic walls, abdominal and heaving respiration, and resonance on percussion more extensive in every direction than it ought to be. The heart, however, is not entirely overlapped by the lung, so that this evidence of local emphysema in the left lung is not complete. Its sounds are healthy.

Emphysema is not usual in girls of seventeen, and we are able therefore the more distinctly to refer this case to the peculiar adverse circumstances in which she had been placed. Congestive inflammation of the pulmonary substance had been induced by exposure in a person previously disposed to it by the typhous state. The congestion had been relieved by treatment, but there was left behind the weakened life of the tissue unable completely to recover itself. This has resulted in gradual local degeneration; in spite of the patient's generally well nourished condition, her lungs are starved.

This is the reason why I have treated her with iron and quinine, in addition to the æthereal tincture of lobelia, which latter was ordered to alleviate the special symptoms at first. She is now able to breathe easier and to lie down in bed, but I am afraid she must be turned adrift on the cold world next week, for one can hardly expect to fit her for domestic service, and more pressing cases demand our beds.

Bridget G., an unmarried servant, aged twenty-five, was

admitted on the 19th. She has the same sturdy build and bloated look as the last patient, and I cannot help thinking that most probably the pathological history of her case is the same. It is true that we cannot draw from her any account of pneumonia; but she is impenetrably stupid and ignorant, and hardly understands the English language, so that I do not reckon her answers to cross-questions as of much worth. She might easily have had slight pneumonia without recording in her memory anything which could lead us to a knowledge of it. Even in the former case, I doubt if the clinical clerk would have made out the occurrence of pneumonia and typh-fever from the girl's tale without the aid of our former notes.

Bridget's symptoms have been coming on three years, and in consequence the lungs occupy a larger space than Annie C.'s, overlapping the heart and rendering the cardiac region resonant. Her degree of dyspnœa, however, is not so great, nor is the orthopnœa so marked. I have often remarked that the asthmatic symptoms of emphysema are by no means proportioned to the large extent of the parts affected; their severity rather depends on the rapidity with which the degeneration has advanced or is advancing.

I have put her on a course of iron, for which I have already to-day told you my reasons.

I have also had her cupped between the shoulders, as an expedient of immediate, though temporary, relief; and an expedient which the prominence of the venous crasis amply justifies in her case;—she will soon recover the blood lost.

She had been taking, by somebody's orders, some pills of squill and ipecacuanha every night. I continued them, in order to observe their influence. On leaving them off she slept quite as easy as (she said easier than) when taking them, and I could detect no change in the quantity or quality of the sputa. So that expectorants are evidently of no use, an observation I have often had occasion to make in cases of emphysema.

You have fairly exhibited in the history of these two girls the slow and gradual march of a degenerative lesion as a local affection in a sanguine and otherwise healthy person. You see it caused by privations and injuries, rather than by any violent special exertion of the part. And you see how these causes act

even in persons not constitutionally liable to such degeneration, namely, with great slowness and without threatening any imminent danger. It is different with leuco-phlegmatic persons. In their case the advance of degeneration is rapid and acute, and, if not checked by active tonic treatment, proceeds soon to its fatal termination.

You will say this is a great advantage for persons of sanguine temperament. So it is. But it has its counter-balance. Degeneration in them is much less amenable to treatment, especially to treatment by iron, which is the most valuable, than it is in the leuco-phlegmatic. Though rarer and slower, its march in them is unfortunately surer, when it has once begun.

LECTURE XXIII.

PULMONARY CONSUMPTION.

Pathological data—The disease localized by morbid anatomy and auscultation—Pitfalls of this knowledge—Not the presence, but the increase, of tubercle, is the chief point—Innocuousness of non-progressive tubercle—Object of treatment should be the organs of nutrition, not those of respiration—Food—Cough medicines—Appetite—Iron—Cod-liver oil—Alcohol—Remedies for diarrhœa—Cachectic phthisis—Chlorate of potash—Delirium in the last stage of phthisis, how caused, and how to be treated—Specifics.

(*Clinical, St. Mary's, December* 13*th*, 1861.)

I SHALL not to-day detail any particular instances of pulmonary consumption. There are now, and always are, several in the wards, to which I have called your attention on points of diagnosis; but it would be wasting the valuable time of a clinical lecture to recite their familiar phenomena, which so far as they affect the treatment, are very uniform, and perfectly familiar to you I should presume.

I take it for granted also that in the systematic course of lectures on medicine you have heard the following propositions, which seem to me to comprise the chief points contributed by pathology towards the treatment of the disease, and in proving which a great deal of time and thought have been worthily, because usefully, spent. I shall assume—

1. That the cause of the symptoms, of the disease, of its fatality in fatal cases, is the occupation by tubercle of vital organs, especially the lungs;—

2. That the tendency to the formation of tubercle resides in the constitution of the individual;—

3. That this tendency may be either hereditary or acquired, or both hereditary and acquired at once;—

4. That the circumstances which quickest develope this tendency are the same as contribute to anæmia, want of supplies for the formation of tissue—namely, starvation, bad air, deprivation of light, exposure to cold without power of resistance, fatigue, previous illness, in short, all depressants of the powers of life.

Anatomy and auscultation have rendered us the enormous service of tracing out truly in death and life the organs chiefly injured in pulmonary consumption, and the nature of the injury done. What an incalculable advantage we have over our grandfathers in this respect! What a contrast between the dangerous confusion of various diseases under one head, the distinctions without differences spoken of in the writings of the bygone age, and the almost finical precision of our diagnosis! But do not stop here; pathology must carry you on further, or you will have gained so little from science, that I doubt if your practice will be any better than your grandfathers', in spite of the treasure of additional knowledge you possess. Often, during our talks upstairs, I perceive signs of your considering the tubercle as "the disease" against which you have to direct the energies of your minds, and from which the patient has to be rescued. You want to do something to "stop" it, to "absorb" it, to "counter-irritate" or "evacuate" it; you seem to imagine that if you could take away that mass of cheesy matter which auscultation puts almost as clearly before your mind as if the ribs were transparent, your treatment would be perfect.

And I fear that in this you might be upheld very often by the tone of medical literature, even of modern date. For example, I read in the 'Cyclopædia of Practical Medicine' that emetics are useful in the early stages of phthisis, by displacing and evacuating the tubercles from the lungs. Can the writer ever have really tried with a scalpel to pick out a tubercle from the pulmonary tissue, when he thus suggests the possibility of the gentle pressure of vomiting effecting such a feat? And I find the effects of cod-liver oil sometimes attributed, not with obvi-

ous common sense to its being an easily digestible oil, but to the minute traces of iodine which it contains. Yea, iodine itself has been given in long courses with the idea of bringing about the removal of the tubercles.

I wish to put these notions out of your heads. What the patient has to fear, is not the remaining of the tubercle in the body, but its increase. That which is once there has done its mischief, its path of ruin is past, the portion of lung which it has occupied is gone for ever, and cannot grow again any more than an amputated leg. The dissections of consumptives almost always show the cause of death to be a fresh formation of tubercle at no distant period, which has abridged the remaining organ to a degree inconsistent with life. A single deposit of tubercle to a moderate extent can almost always be recovered from. It is the continuous repetition of the morbid process which is so fatal.

I cannot, therefore, too strongly impress upon you, that not so much the tubercle as the tendency to form tubercle, not the morbid matter but the diathesis, is that which should occupy your thoughts.

When tubercle first takes its place in the pulmonary tissue, the lung feels a good deal inconvenienced by its presence; there is cough, inflammation round the foreign body, and condensation of the neighbouring substance; and this is accompanied by general ill health, arising from the sudden loss of part of the respiratory function, to which loss the system has not had time to become accustomed. These consequences are directly proportioned to the quantity of lung spoilt. They may be so severe as to cause death by what is called "tuberculous pneumonia," or by "galloping consumption," when a large extent of lung is very quickly rendered unserviceable. Or, when the injury is more gradual and slighter, they may be so insignificant as not to have attracted notice at all. The other day in a patient of mine who died of chorea dependent on a tubercle in the spinal cord, you saw at the post-mortem examination scattered tubercles in both lungs which had caused no symptoms at all during life, though they probably had been there much longer than the tubercle in the less usual situation which proved fatal. And very often in persons killed by

accident, apparently in the prime of activity and with no history of any serious illness, you find crude tubercles, scars of former tubercles, and the chalk-like débris of tubercular matter.*

Passing on to more agreeable evidence—we find people with a very large quantity of tubercle in the lungs, so large as to have almost proved fatal, who yet recover to a great extent from the mischief which it has caused. When once the lung has got over the shock produced by the presence of the first load of dead matter, the health recovers, and the patient (though imperfect in body of course) has only to fear a fresh crop. It is astonishing what enormous ravages may be made in the lung, and yet with the help of what remains how people will recover the health that has been lost. I dare say you may remember last summer a poor old woman sent to the hospital to die. There was in the left upper lobe a vomica, so large that there was "metallic tinkling" in it; and for some weeks I took the opportunity of teaching you this sound. You know from my lectures on diagnosis that it hardly ever occurs except in pneumothorax with perforation, and not always there; that it is very rare in vomicæ, and when present indicates a cavity bigger than your fist at least. So weakened was the patient by the loss of so much lung, that she was first unable even to feed herself, and quite soaked the bed with colliquative perspirations. Yet, contrary to all our expectations, she lost her night sweats, gained flesh, walked about the ward, and finally walked home during my absence from London, so that I cannot say what was the exact state of her chest on leaving. But I will take for granted that the cavity remained unclosed, and probably will remain unclosed for the rest of her life.

I say I take for granted that the cavity will remain unclosed for the rest of her life, from my experience of post-mortem examinations, which lead to the conclusion, that in cases of cured phthisis pulmonalis vomicæ rarely heal up, but that they

* In 566 autopsies of tubercular persons, which I found recorded in the *post-mortem* books of St. George's Hospital, during ten years, there was seen the so-called "cretaceous" matter in the pulmonary tissue in 65. See 'Decennium Pathologicum,' chap. v, sect., 7 where statistical arguments are assigned for considering this solid substance to be really of tubercular character.

become dormant and comparatively innocent, lined with a thick, pus-secreting membrane, and thus separated from the healthy lung around them.*

I can give also other and living evidence.—For example, R. S., a wine merchant aged forty-two, was, in 1846, under the care of several of the most experienced in chest complaints of the London physicians. He had a large vomica in the left apex, was excessively debilitated by it, and was sent home with the information that he could not live a month. Well, he picked up strength and flesh, was enabled to return to his business, and, when I saw him in 1858, twelve years afterwards, he was in fair health, and as able to do a moderate day's work as anybody I know; but auscultation left no doubt that the vomica was still open in the lung, and that the small quantity of pus he expectorated came from it.

In 1855, I advised a young man, with softening tubercles in the left lung, to accept a chance which he had of settling in the West Indies. Six and a half years afterwards, he returned to England for a temporary purpose, and came to me about some symptoms not connected with his chest. I found that his vomica was still there, and secreting pus; but that he had never permanently lost again the flesh which a course of iron and cod-oil had put upon him. He had even had an attack of hæmoptysis, and gone through yellow fever, without serious injury.

As a contrast to such cases—and the way in which we lose sight of our patients prevents our multiplying them—as a contrast to these where vomicæ have become innocuous, compare those in which chronic consumption proves fatal. In the latter, a dissection always (accidental cases excepted) reveals, either in the lungs themselves or in other vital organs, a formation of fresh hard tubercle as the cause of death, besides the established vomica or the old masses of morbid matter.

It is clear, therefore, that it is the tendency to tubercle, and not the existing tubercle, which we have to fear and to guard against; and that for the successful treatment of consumption

* Reasons are given in the chapter cited in the last note from my 'Decennium Pathologicum,' in the Medico-Chirurgical library, for believing that "chalky masses" in the pulmonary tissue are not the remains of vomicæ but of hard tubercle, which has dried up without softening.

we must withdraw our minds from the morbid anatomy of the locality to the fatal propensity of the constitution.

To my mind, it is a great relief and rest to be able to map out by auscultation the exact extent of the mischief done, and to know that there is enough of the morbid change discovered to account for the severity of the symptoms. I feel then like a general who is acquainted with the exact position and whole force of his enemies, and is sure that the country will suffer no further loss if they can only be kept from advancing.

In the case of chronic consumption hope should never be entirely lost. If the remaining portion of lung has retained life so long, it can retain life longer, and the whole attention can be applied to its conservation. There is no question about the future conduct of the war, if only reinforcements for the enemy can be stopped in their march.

To what quarter must we look for aid in this conservation? I know you are disposed to turn first to the lungs. But if we inquire into the histories of those who have lived long with vomicæ or tubercles, they are by no means found to have taken special care of their chests—they have not coddled or lived in-doors in even temperatures, hanging their lives on to their thermometers for fear of coughs: they have gone on with their professions or business or work: they have not "laid a knife to their throat," but have eaten and drunk like other people, and have enjoyed the gratification of their appetites. A patient of mine, over fifty, with copious pyoptysis and condensed lungs (of probably a tubercular nature) from his youth, has kept hounds, broken his bones like other Nimrods, contested county elections, sat in parliament, enjoyed his champagne and other good things, but *never allows any doctoring of his chest*. An examination of it is a favour, as a contribution to science.

Nor is it only when tubercle is established that it may be arrested by exposure of the body to active change; even the tendency may be averted. I examined for insurance a few weeks back, a gentleman aged fifty-five, the second of a family of eleven in whom phthisis was hereditary. Circumstances have caused the three eldest to rough it in the world: they have travelled and worked, and now, when wealthy, they are healthy, active sportsmen. The seven youngest were

coddled and petted, and all died of consumption under twenty-five.

The necrological statistics of the phthisical in the two sexes corroborate this deduction. Although males are more liable to tuberculosis than females, yet they are less liable to have that tuberculosis exhibited in the lungs. (See 'Decennium pathologicum,' chap. iv.) Now in all classes of social life, women are the least disposed to exert and expose their lungs; they are more ready to invalid themselves; and in the lower classes, whence these statistics are taken, they do not wear low dresses or tight stays (to which habits some have attributed consumption). Yet we find that tubercle with them takes the direction of the spared organ.

You may perhaps say, "This spared organ is a most important one: I will sacrifice the others to the possible chance of saving it." But consider—what is this tubercular matter? It is not anything peculiar to the lungs, but may arise from degenerated nutrition—the inferior development of life—of any part, and may occur in any part. Now, excepting my glands, many of which I could easily spare, I should prefer having it in my lungs to any other part of my body; for I know that I can live with a good deal less pulmonary tissue than nature has given me. But I cannot live with it in my brain, or my heart, or my alimentary canal, of which I have only one. So that if tubercle is to exist at all, I really do not know that we should look upon it as a misfortune when it occurs in the chest, as it is safer there than in most parts of the body.

If then care bestowed upon the lungs and special coddling of them increases the danger of tubercular tendencies, as the above arguments clearly show; and if, supposing that special medication could keep tubercle out of the lungs in particular, no advantage is thus gained—to what would I have you turn?

Leave the respiratory organs alone, and direct your thoughts to the organs of nutrition, the stomach and bowels, which will receive with thankfulness and return with interest any care you bestow upon them.

It is truly by aid of the digestive viscera alone that consumption can be curable. Medicines addressed to other parts may be indirectly useful sometimes, but they more commonly impede

the recovery; whereas aid judiciously given in this quarter is always beneficial and usually successful.

The chest is the battle-field of past conflict, the stomach the ripening ground for new levies of life.

Your aim should be to get the greatest possible amount of albuminous food fully digested and applied to the purpose of the renewal of the body, at the same time that the renewing agencies are brought to their highest state of efficiency. In this way a healthy cell-renewal takes the place of that morbid imperfect cell-renewal which appears in the shape of tubercular matter.

With this view I shun, as far as I can, all those "potent herbs and baneful drugs" which may be classed together as "cough medicines," meaning antimony, ipecacuanha, and squill especially. I avoid also mercury, purgatives, and neutral salts, which are debilitants. Where the heart is thin and weak, digitalis is sometimes useful, by regulating and calming its action; but as a rule it is injurious, by reason of the nausea and loss of appetite which it causes.

The appetite should be the great object of your care. You will often find it sadly wanting; and where that happens, the mucous membrane of the stomach and bowels should be braced up by quinine and strychnine. The latter acts quickly, and may be added to the other medicines from time to time; but the former is most permanent in its effects, and should be begun at once, and continued through the whole process of medication, till the appetite equals or exceeds that of a healthy person.

Iron, again, you will find a most powerful ally. The increase in the hæmatine of the blood which follows its use is all-important; for thus you supply to the tissues the true life-giving medicine—red blood. Begin iron in small doses, and gradually increase it till you have found the full quantity the patient can take, and then continue to administer rather less than that, so as to leave room for an occasional augmentation according to circumstances. Where you give digitalis, make it a rule to add iron and sometimes strychnine to the dose, as you thus get the full advantage of the digitalis, and shirk some of its possible evils. Iron prevents nausea, and strychnine co-operates in strengthening and regulating the action of the weakened heart.

When the repugnance to eating is extreme, adopt the plan you so often see used in these wards with success, of giving milk in small and very frequently repeated doses. Nutrition has a habit like that of arguing in a circle; food creates the desire for food—of course, by strengthening the digestive organs; and thus, after a few days of milk diet, the patients will voluntarily ask for meat, and enjoy as a luxury that which a short time before excited the greatest disgust. If you find the milk lie long in the stomach and produce heartburn or acid eructations, add lime-water or soda-water to it. The first is the cheapest, the latter the pleasantest.

Cod liver oil will also often, like milk, create an appetite. But as a rule, especially in private practice, it is well not to commence it too soon; for the nastiness of the taste and feel is hard to get over at first, and it is much easier to take it when the appetite has begun to be renewed. Then it is not felt as a hardship even to begin, and in a short time patients will get really to like it. And they will like it, not merely as reasonable men like that which does them good, but irrespectively of such knowledge they will find it nice to the palate. Thus children, who always hate being done good to, will still often take to their oil with gusto. And as a proof that exalted reason has nothing to do with the preference, the same thing has been observed in brutes. A clerical friend of mine had a consumptive Skye terrier, which he treated *secundem artem* with cod-liver oil. At first the poor beastie abhorred it, and looked sad before and after each dose; but in a short time he began to lick his lips after it, and if he was forgotten, would go and beg *more canino* at the door of the cupboard where it was kept.

The best sort of cod-oil is the most agreeable, the clearest, the sweetest, and the most scentless—that, in fact, which is thoroughly free from extraneous dirt. The oil from the same fish, formerly used by curriers, was sold for their use cheap and foul, and no doubt was quite good enough for manufacturing purposes; but it must excite a very natural disgust in any one but an Esquimaux or a whaler, I should think, for it stinks like old train-oil. Its low price wholesale allows of certain firms spending large sums in widely advertising it as a superior form of drug; but I strongly advise you never to prescribe the "brown oil"

(as the name runs); it is never beneficial where the pure oil fails, and it often and often makes the patient protest he will on no consideration take it again. The mode of manufacture which causes the difference of the "brown" and "pale" oil is described in an article of the 'Medico-Chirurgical Review' for January, 1856, and is quite enough to prevent any reader of delicate perceptions ever ordering or taking it again.

The best plan is to give at first a teaspoonful, and afterwards two teaspoonfuls thrice a day, floating on the quinine or iron mixture to which the patient has already become habituated. I think an ounce a day is enough to administer as the full dose, and need not be exceeded. If the patient absorbs all that, you may be quite satisfied; and more will be apt to turn rancid, and cause indigestion—the worst foe of the phthisical. The best time to take it is at the greatest distance from meals, as thus a sort of additional meal is gained, and food and physic are not confused; but if your patient likes any other time better, on account of taste or business, do not stand in the way of his fancy.

The effects of cod-liver oil become less and less a marvel, the more we know of physiology. The instinctive desire shown by all nations for an oleaginous diet, and their association of substances of this nature with proverbial ideas of happiness in all ages, show the value of a certain amount of it to man's comfort. The "butter and honey" of the prophet, used as a phrase for royal food, and the constant reference in the Bible to oil as a luxury (though it could have been no rarity in "a land of oil-olive")—these are sufficient to prove its estimation among the Hebrews. The Hindoo labourer, when he devours his gallon of rice for a meal, will spend all the pice he can get on the clarified butter of the country; and "as good as ghee!" is his expression of unqualified admiration. It was a mistake in Baron Liebig to state that oily foods are disgustful to natives of hot climates. All races of men require them and seek after them; and the taste of the Esquimaux, so often quoted, depends mainly on the abundant supply of the article which the sea places at his disposal, coupled with a scantiness of other provisions. Throughout mankind there is an instinctive appreciation of the importance of this aliment, independent of accidental differences of nation or locality. It seems felt to be, as science shows that it really is, a necessary

material for the renewal of the tissues, and the desire for it becomes synonymous with a desire for augmented life.

An easily assimilated oil comes, in fact, into the short list of directly life-giving articles in the pharmacopœia; for it is itself the material by which life is manifested. Hence, under its use, beneficial influences are exerted throughout the whole body; old wounds and sores heal up; the harsh, wrinkled skin regains the beauty of youth; debilitating discharges cease, at the same time that the normal secretions are more copious; the mucous membranes become clear and moist, and are no longer loaded with sticky epithelium; the pulse, too, becomes firmer and slower—that is to say, more powerful, for abnormal quickness here is always a proof of deficient vitality. Such are the effects, perfectly consistent with physiology, of supplying a sufficiency of molecular base for interstitial growth.

The addition of a small quantity of alcohol will often enable the oil to be absorbed more readily. This is a principle well understood by growers of live stock for prizes at agricultural shows, who, by the addition of fermenting grains or spirits to the animal's food, often fatten it more quickly. The addition therefore of wine, whisky, tincture of orange-peel, or of any other harmless bitter to the medicine, is rational, and may be freely conceded, if the patient finds it agreeable.

The liberal use of it as a remedy or preventive is a different question.

In my opinion alcohol is not only useless but injurious to the consumptive, excepting for its beneficial action upon the mucous membranes. It arrests and obstructs the vigour of vital action; by it growth is checked, as we see practised in animals kept small for artificial purposes, and in men who have from youth habitually indulged in ardent spirits. Under its use renewal goes on slower, as we know by the diminished excretion of urea, water, bile, &c. (see Dr. Böcker's 'Experiments,' and the concluding lecture in this volume), and we can hardly therefore reckon it advantageous where the chronic renewal of vital powers is our primary object.

But you may ask how are to be explained cases like the following, in which to all appearance alcohol seems the preservative of life.

J. P., a butcher, remarkably strong and stout, was first attended by me for delirium tremens, which he had suffered from several times before, and was always well in the interval; an attempt to become a teetotaller was immediately followed by galloping consumption;—

J. A., a brewer, came to me last year about indigestion and pimples (acne rosacea) on his nose and face; I urged him to give up brandy-drinking before breakfast and between meals; and I find now a developed vomica in his lungs, of which previously there was no evidence.

You may cite instances such as these, and attribute the vomicæ to the omission of alcohol, which therefore you may represent as a direct preservative. I think you would be wrong.

I confess I do not take such cases as mere coincidences, but I explain them in a way by no means corroborative of the idea that spirit-drinking keeps off consumption. I think that alcohol acts as an anæsthetic, and prevents the system from resenting the presence of the tubercles; then, when it is left off, they act with doubly deleterious effect on the body, unprepared by their gradual increase to bear them as it were by habit. The quondam tippler is then in the same relative position as one in whom there is a large sudden development of the morbid matter; for the existence of the morbid matter unexpectedly becomes known to the system, and its ravages suddenly taken notice of. Thus instead of really checking tubercular disease, the alcohol has acted merely as a mask, behind which the evil has gone on unawares.

What should you do in such cases as those above related? Should you advise a return to drinking habits? I think not; for though the symptoms are somewhat lightened thereby, this is merely a misty cloud of anæsthesia which stands between the patient and his pain, and I doubt if life is prolonged. Moreover it is possible to adopt measures as immediately effectual, while certainly offering more prospective advantages. In the last case which I quoted, after a certain struggle with bronchitis, night-sweats, and emaciation, weight and strength are being gained under cod-liver oil and quinine, although the allowance of alcohol is reduced to that of a temperate man. So

to such remedies I advise you to trust in all like cases. Here, as ever, the appetite must be your index; the stomach must be the viscus whose health is to be your care.

In advising foreign travel, again, take the stomach for a guide. At the dreary time of the English year, when your patients cannot get enough light and exercise to give them an appetite, let them seek those sunny climes where the winters are the holidays, the joyous seasons for out-of-door employment. Madeira is the best. The next is that lovely Mediterranean shore recently annexed to France, from Cannes to Mentone; and after that comes a long list of localities highly praised by their inhabitants, but with a more uncertain climate.

Instead of naming one place after another, and thus risking offence to a large number accidentally omitted, I prefer to give you a simple common sense rule by which you may help your patients to make the best use of the winter season.

In choosing a home for your consumptive, do not mind the average height of the thermometer, or its variations; do not trouble yourself about the mean rainfall; do not be scientific at all, but find out from somebody's journal how many days were fine enough to go out forenoon and afternoon; that is the test you require, and by that you may be confidently guided.

Do not suppose all is done when you have chosen a climate. Your responsibility is by no means ended; you must be careful in enforcing a right use of the climate. If your patients from distaste of foreign habits, from pining after home, or other causes, take to moping in-doors, or find themselves overwearied on going out, the sooner they return to England the better. They are getting no good, and they are running the risk of diarrhœa, low spirits, hysteria—or still worse, of failing so much, that they cannot return home, and must remain to die, "by strangers honoured, and by strangers mourned."

But if they write you word that they are boating, riding, swimming, sketching, catching lions in Algeria, or butterflies in Madeira, you may congratulate yourself on having added perhaps months, perhaps years, perhaps lustra, to their lives.

Next to the stomach, the bowels claim your main care. Of

course, during this course of lectures, in which I am impressing upon you the principles of restorative medicine, it is needless to say that in pulmonary consumption you are to shun artificial purgatives. But I had better remind you of the importance of being on your guard against natural diarrhœa. Do not allow it to go on an hour longer than you can help. The best remedies are sulphate of copper, hæmatoxylum, and opium. Chalk mixture will sometimes act well; but, if it fail, you have lost valuable time; so, if you follow custom in beginning with it, do not be obstinate in the continuance of your remedy. The sulphate of copper may be begun in doses of one-fourth of a grain, and increased up to two grains, if required to be persisted in. The hæmatoxylum may be given as an extract from four grains up to any amount required, but should not be mixed with the copper, or you produce an ink. If you give both, let there be three hours' interval between them.

You see almost daily cases of consumptive diarrhœa checked sometimes for a season, sometimes even permanently in patients whose disease is too extensive for recovery. This is doubtless a great point gained, and some time added to life. But more than this, I believe that the tendency to deposit tubercle also is sometimes arrested by arresting the bowel-complaint. Just after Lady-day 1861, Miss Harriet B., aged thirty, whose "father and mother had both died of decline," was placed under my care by Dr. Buckell of Chichester. She had evidence of a small focus of tubercle in the apex of the left lung, producing pain, dulness, and crepitation (from the partial condensation of the lung round it) but no marked pulmonary ailment. I thought that the quantity of tubercle was slowly increasing from week to week. What she complained of, however, was emaciation and diarrhœa, accompanied by the passage of pus and sometimes streaks of blood in the mucous fæces. She was soon relieved of this by appropriate remedies; and with a store of hæmatoxylum and copper was able to go on a long summer visit to some friends. I heard of her as going on well, and did not expect to see her again, or to make her case available for science. But as she returned through London in September, proclaiming herself quite well and stout, I had an opportunity of examining her chest again; and much to my delight was it that I did so.

To my surprise, I could detect no disease at all in the lung; so that, instead of increasing, as I had feared, the pulmonary tubercle had become dormant, solely by the cure of the bowel complaint. Not all cases do as well as this, but still what has once befallen may befall again, and it is the surest road to success to hope for it.

(*Clinical, St. Mary's, June 7th*, 1862.)

In some cases of consumption there is a considerable amount of cachexia, the gums become spongy, or whitlows form on the fingers, or there are various kinds of skin diseases. This happens usually in consequence of low living, damp, and depression of mind.

There is now in Victoria ward a girl of sixteen, who was transferred from a surgical ward. She was at first in a deplorable condition; she had been admitted for impetigo,* with which her cheeks and nose were covered, while the pads of her finger-tips and nails were sore and purulent from the same eruption. Yet the impetigo did not account for colliquative night-sweats, extreme emaciation, and weakness so great that she could not raise herself in bed: these symptoms were explained by dulness at the apices of the lungs and localized râles, indicative of tubercular condensation. Some thought there was a vomica at one apex, on account of the cracked-pot sound on percussion, but it was a doubtful point—the cracked-pot sound is a very fallacious sign. She did not behave as if there were a vomica, for she has been gaining strength and flesh daily up to this time. My reason for recalling this case to you is to notice that, in spite of tonics and high feeding, before she came under my care she had been getting weaker and weaker. The only change I made was to give with her tonic mixture half a drachm of chlorate of potash daily in some cod-liver oil—I confess with but little hope that she should revive. I was never so struck before by the directly vitalizing force of this salt upon connective

* *Impetigo*="a superficial formation, consisting mainly of *pus* from the denuded connective tissue of the corium, without external exciting causes."
Eczema="the same of *serum*."

tissue. In a fortnight her "flesh came again like unto the flesh of a little child," as the Hebrew historian beautifully expresses it; the clear doll-like complexion of face and the pink babyish finger-tips are very pretty. And I have no doubt that a like quickening has gone on in the skins of the inside—the mucous membranes—so much strength and appetite has she gained.

This case shows you when to give chlorate of potash in consumption with hope of profit. And I am glad you have the opportunity of seeing this, because a short time ago chlorate of potash blazed forth as a cure for phthisis in general; and if you have tried and found it wanting in some ordinary instance, you might be tempted to treat with undeserved contempt a medicine of really great service in proper cases.

(*Clinical, St. Mary's, February 6th,* 1864.)

On my last admission day, January 29th, there were received under my care two very distressing cases of consumption. Both were in the extremest state of emaciation and exhaustion from suppurating vomicæ in the lungs, and so far presented a spectacle which is sadly familiar to the medical man. In addition, the woman was purple in the lips and face from intercurrent pneumonia, the man was in a cold sweat and had diarrhœa. But the symptom exhibited by both in common, which leads me to mention the cases to-day, is one not quite so usual as these, yet sufficiently usual to make it of practical importance. I allude to delirium. The man got temporarily somewhat better of it after a few days' residence in the hospital, so that his mind wandered only at night, but the woman has been disturbing the ward with her continuous ravings, has been very violent, exerting her small remains of strength to throw the beef-tea at the nurse. She uses such abominable language that it has become necessary to place her in a room by herself.

Delirium at the latter end of exhaustive diseases is a sign of the participation of the nervous tissue in the destruction which is going on among all the tissues of the body. It answers to the convulsions and obtuseness of sense, which M. Chossat observed

in animals starved to death.* The nervous system, being the *ultimum moriens* of the body, suffers last, but does suffer in the end.

This delirium is commonly accompanied by deafness, and is so accompanied in the two cases before us. I cannot say I have been able to trace a corresponding deficiency in the organs of sight, but certainly the taste and general sensation are deficient. The pain in the chest and suffocation, which the poor woman complained of on admission, are denied now that the raving is worse, and she does not appear to know food from medicine.

The immediate cause, to which I have most usually seen occasion to attribute it, has been unwonted and excessive bodily exertion, at a time when extreme rest constitutes the only possible means of economising the vital power. I have no doubt but what it was the being brought out of their beds to the hospital, which made these patients so much worse directly on their arrival, and which threatens to shorten their lives.

In those who die no morbid change in the nerve substance is visible after death, though the symptoms during life generally cause it to be carefully looked for. This fact is familiar enough to those who have the inestimable pathological privileges of a public institution: but I think it is often unknown to others; and, consequently the natural connection in their minds between the increase of symptoms and the spread of tubercle in consumptive cases is apt to lead to their assigning the delirium we are considering to a development of tubercle in the brain. Two months ago an old gentleman in the last stage of senile phthisis was brought up from the country by his family, contrary to the excellent advice of their own medical man, to obtain "a London opinion." I believe they had already taken him to one physician previously, when he arrived excited in mind and worn out in body, in my study. I felt much relieved when a glass of Madeira enabled him to be got back to the carriage, for I should not have been much surprised at his dying in my house; and you may easily imagine that I rebuked the folly of his friends in strong language. However, he did get home. But very soon he became delirious and raving, as I learnt by letter; and I found that this delirium was attributed by those who attended

* See before, pages 21—25 of this volume.

him in the country to tuberculosis of the brain. The idea is a natural one, but it might have injured the patient had it influenced the treatment. His death in delirium was indubitably due to the almost superstitious folly of his friends in bringing him up to London.

As to treatment, opium, wine, and continuous nutriment seem indicated, and to be of some use; but such cases of extreme disease are not usefully illustrative of medical regimen. The man has been better since he began cod-liver oil and quinine, and perhaps the nourishing thus the nervous tissue, if the food can be assimilated, is the best application of restorative principles.

(*Clinical, St. Mary's, May* 10*th*, 1862, &c.)

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A few words as to specifics for consumption. Some years ago, Dr. John Hastings proclaimed "naphtha" as an unerring cure. Some people tried it, and soon learnt that it was applicable at all only in cases where alcohol was beneficial, and even to such patients they found that the purer and wholesomer forms of alcohol in daily use were both more useful and more acceptable. All the advantages of the remedy had been in the hands of the public in a pleasanter form centuries ago. Determined at last to try a virgin substance—

—"integros accedere fontes
Atque haurire"—

the same gentleman has lately announced that serpents' dung now succeeds to the throne where naphtha lately reigned. Our rude forefathers in art administered many curious things; the ashes of toads, the urine of boars, live spiders, human liver, human ordure, the skull of a murdered man, the blood of the patient's father, and other gatherings from witches' caldrons, are in their lengthy pharmacopœias, and are many of them stored in that interesting collection of ancient articles of materia medica at the College of Physicians. Their intention was to drive out the devil by disgusting him. But I do not think that they ever hit upon the bright thought of using the very dung

of the accursed type of evil, that as he indignantly "goes out," he may say,

> "That eagle's fate and mine are one,
> Who in the shaft that made him die
> Beheld a feather of his own
> Wherewith he wont to soar so high."

I really believe this expansion of the idea to be quite original.

Good coprologists tell us that the united excreta of snakes consist mainly of lithate of ammonia—an unattractive substance, which persons familiar with physiology believe to be harmless. I rested satisfied with that belief till I heard Dr. Hastings, when arraigned before a public court of justice for avaricious malpraxis in knowingly administering inert remedies, depose positively on oath that he held what he administered to be a powerful physiological agent. His powerful physiological agent was made by dissolving (*i. e.* destroying) sixteen grains of boa constrictor's ejecta in a gallon of water by the addition of bromine. Such a solemn affirmation was not to be lightly treated, and after that I could not feel justified in believing fæces to be useless till I had tried them. I procured forthwith a sample from the secretary of the Zoological Society, and caused to be made a quantity of the so-called "solution" under the name of "mistura pythonis," and you have seen me order it pretty often since in cases where, no drugs being required for a time, I felt myself justified in so doing. But instead of half an ounce, which was said by the witness to be so active, I have given two ounces three times a day. You have seen that its effects are exactly the same as those of so much ditch-water.

Such is the fate of specifics for phthisis—*ex uno disce omnes*—and lucky is the public if all specifics are as innocent as snakes' dung.

But do not let us part without a moral, or be satisfied with merely laughing at a delusion. Remember, you are acting no better than the vaunters of vain specifics when you vaguely prescribe one thing or another, even of known and acknowledged power, because you have heard of its being "good for consumption." The time which is lost in trying this and trying that remedy is lost for ever. You have no warrant for supposing that there can be any specific for that complex morbid state

which causes phthisis; you have no warrant for substituting a vague search after such specifics for rational treatment; nor can you justify yourselves for standing in the way of the patient getting his chance of a renewal of his waning life by the unsparing use of restorative agents.

The proper persons upon whom to try the effects of new remedies in the first place are not the sick, but the healthy or nearly healthy. If no obvious results follow the use of full doses by yourself or another free from present illness, you may be pretty certain the same will be the case with your patients. There are always to be found in hospitals specimens of malingerers and "old soldiers," and convalescents, upon whom it is quite safe to try these experiments under proper supervision, so as to satisfy any doubts you may have. Or if you have no doubts to begin with, you will thus gain a right to make the shortest and most telling answer to inquiries, "How does such and such a cure succeed?" "I've tried it and it is useless."

You should make it a rule absolute, that objective phenomena rather than subjective are to be taken as tests, and that all things are to be "delivered in number and weight," according to the sage advice of the Son of Sirach. For instance, if you were examining the action of quinine, the changes of temperature must be estimated by the thermometer, the changes of urine in the laboratory, the action on the skin from the amount of perspiration. And you must not waste time by performing as tests experiments which do not admit of physical or arithmetical proof.

LECTURE XXIV.

THORACIC ANEURISM.

First case of aneurism, probably of the innominata—Reasons for diagnosis—Aortic valvular murmur accounted for—Probable abnormal position of artery—Prognosis unfavourable—Second case—Aneurism of aorta and its treatment—Blood-letting and low diet—Pathology of aneurism—Object of treatment—Favourable prognosis—Two cases of favourable result of treatment—Fatal case of aortic aneurism—Rupture of sac into the pleura in a healthy working man—Length of time a patient may live with a ruptured aorta an encouragement to treatment—Case of aneurism compressing the trachea, producing congestion of the lungs, and so fatal—Actions of bleeding, leeching, and digitalis—Action of digitalis on other involuntary fibres, as on the uterus in menorrhagia, and on the bladder in incontinence of urine.

(*Clinical, St. Mary's, January 5th*, 1861.)

I TAKE the opportunity of having two patients in the wards afflicted with aneurism of that sort which alone comes under a physician's case, viz., thoracic aneurism, to call your attention to the medical aspects of the lesion.

The board admitted, yesterday, into Victoria ward a young woman of twenty-two, who has been a patient of mine in the Lock Hospital. She has had syphilis on and off ever since the age of fourteen; and though the eruptions and sores are now healed, her health is much broken, and she is stunted and weakly. She applies at St. Mary's not for her old complaint, but on account of palpitations, and pain across the front of the chest,

which she states that she has felt for three years, but which lately had got much worse. She also frequently suffers from giddiness and fainting; and last Sunday was carried out of chapel in a dead swoon. A message has just come to say that on account of one of these attacks she is unable to come down to the theatre, as I bade her.

She has often a difficulty in swallowing food, especially solid food.

She states that she has very partial use of the left arm; and, on examination, it is smaller in girth to a marked degree, and the muscles are flabbier than on the right side. No pulse can be felt at the left wrist, nor at the bend of the elbow, nor on the inner side of the biceps. The axillary artery can be felt beating very feebly above the collar-bone.

In a marked contrast to this stands the right side. The pulse at the wrist is natural, and above the collar-bone may be perceived a strong pulsation, and at the origin of and for an inch or more along the carotid artery a very distinct thrill. In the hollow above the sternum the same pulsation is even stronger, and throws forward the trachea, when you press upon it with your finger.

With a stethoscope a purring whiz is heard in the same situation as the pulsation is felt. A murmur is heard also at the upper part of the sternum, and is particularly loud on the level of the fourth costal cartilage, where it sometimes has a musical tone. There is no dulness on percussion beneath the clavicle.

My diagnosis of this case is, that she has an aneurism of the ascending aorta at the part where the innominata is given off, and that this lesion involves the innominata and the origin of the carotid artery. I do not think it an enlargement of the innominata alone, because of its being situated so much at the back of the trachea as to throw the tube forward by its pulsations and also to press upon the œsophagus, and interfere with deglutition. Besides, in the only case I have seen during life of pure aneurism of the innominata, proved to be so after death, the tumour was smaller and rounder, and pointed more distinctly in the supra-clavicular hollow.

You have here nearly all the signs of aneurism of the aorta

—(1) pulsation; (2) whiz; (3) impaired deglutition; and (4) impeded circulation.

But you may say there is the same whiz at the aortic valves. What is the cause of that? It is not, I think, produced directly by aortic aneurism, but it is produced by the same original cause. Aneurism forms because there is a friability or loss of elasticity in the coats of the vessel, due generally to a deposit of white opaque matter and to a partial degeneration of them. What is more likely than the existence of the same disease in the aortic valves?

Now I come to the puzzling part of the case. You will observe that the right axillary artery is quite free; there is quite an open passage through it to supply the radial at the right wrist. Yet it is in this supraclavicular space that we have the pulsation and whiz; whereas the left axillary, though it has normally nothing to do with the innominata, is not supplied with blood, and the left arm is atrophied.

I can account for this in one way, which I might as well detail, though it is more a matter of curiosity than of business. (I do not bind you to accept the interpretation; and if any of you fresh from the anatomy school can suggest a better, I shall receive it with pleasure.) In many beasts, in the ruminants and solidungula, and in some pachydermata—as for instance, the hog—the aorta divides into two branches, the ascending giving off the two subclavians and the two carotids, while the other turns backward and becomes the descending aorta. On this has been founded, by the earlier anatomists, the popular division of the aorta into "ascending" and "descending," a division awkward in the human species, but exceedingly applicable to the domestic animals whence the ancient men of science learnt their anatomy. It is by no means impossible that the patient before us may have a malformation, which is an approach to this lower condition of animal life—a malformation, of which specimens may be seen in many museums; namely, where the left subclavian, as well as the right, is given off by the innominata, and has to cross over the arch of the aorta to get to its work; and in this crossing it would be interfered with by the tumour of the top of the arch. I cannot otherwise unravel the enigma, as the tumour is not large enough to obstruct a normal

left subclavian. As an argument in support of the explanation, I may mention that the patient has a congenital deficiency of the reproductive organs, curious in a social point of view to find in a person of her degrading habits, for she is a common prostitute. She has no uterus, the vagina ending in a short cul-de-sac. A malformation in one part is a probable argument for it in another.

This aneurism presents several points which lead me to pronounce an unfavourable prognosis. *First.* It is in the ascending part of the aorta. Now, you will find that almost all aneurisms of the ascending aorta are rather dilatations than aneurismal sacs. They have no sharp edge opening out suddenly into a distinct bag. And these dilatations are more difficult of cure than the sharp-edged sacs, because there is a clear stream through, and no back current, so that you cannot get clots to form in them. *Secondly.* The absence of clots is confirmed by the strength of the thrill. *Thirdly.* The supply of blood to the brain is seriously diminished, as is shown by her fainting fits. *Fourthly.* The impeded deglutition and the suspected malformation are discouraging. *Fifthly.* She is a poor anæmic woman, reduced by poverty, syphilis and mercury to a very low state. She will not bear lowering treatment, I am sure. *Sixthly.* She is said to have, like most of her unhappy class, a violent temper; so it will be difficult to detain her in the hospital, or to keep her circulation quiet while there.* It is doubtful how far we shall be able to apply the treatment suitable for the disease, and how far it will prosper, if applied. What that treatment is, I shall best tell you after the next case.

Henry E., a negro, aged twenty-one, came under my care two months ago—viz., on November 9th. He is now a commercial traveller, but during the Crimean war was a sailor in a transport, during which time he got a severe blow on the back of the neck from a "derrick." He says he never had cough or shortness of breath, and was always "strong in the chest," till he began to feel a pain there in August, especially between the left nipple

* Very soon afterwards it was necessary to turn her out of the hospital for gross misconduct, and I have not been able to find what became of her. As she is corporeally rather a remarkable person, perhaps this notice may bring the desired information.

and the collar bone. This pain increased gradually, though intermittingly. Three days before we saw him, while he was at his tea at Windsor, it suddenly increased very much, and he says he felt "as if something was going up and down from his heart to his arm." He fell down, was struck dumb, and found that he had lost the use of the left arm. On his admission, it was found that the pulse in that wrist was much weaker than in the right, and there was loss of power, though not absolute paralysis, throughout the limb. The throat was externally swelled on the left side, and the carotid could scarcely be felt. There was considerable swelling of the whole mammary and infraclavicular regions, in which latter also there could be distinctly made out comparative dulness on percussion. This dulness was more distinct on the third rib than immediately beneath the collar-bone. On applying the stethoscope to the third rib, a distant whizzing murmur could be heard, which increased in intensity in nearing the shoulder, and was less loud towards the sternum. There was no pulsating tumour, and the lung-sounds were natural, except perhaps rather more bronchial on the left side than on the right. There was a breathing pulsation in the left jugular vein.

The signs of aneurism were not so distinct as in the last case, because it did not come so near the surface. I am inclined to think it is towards the back of the descending part of the arch; but wherever its exact locality may be, it evidently interfered with both arteries, veins, and nerves, which supply the arm, intercepting the pulse-wave and the nervous current, and causing anasarcous tumefaction from its obstruction to the return of blood by the veins.

Local treatment was desirable, and leeches were applied several times beneath the clavicle. He would have been bled also; but five days after admission he fortunately caught scarlet fever from a neighbouring patient, and it struck me that this might prove a substitute for venæsection; for it gave us a plea for keeping him a close prisoner in bed, and putting him on very low diet. This plan was the easier carried out from his being, like most civilized Africans, of a mild tractable disposition, and it has been pursued steadily up to the present time. On December 1st, it is noted by the clinical clerk that he had recovered power over

the arm, and that the pulses appeared nearly equal. He has continued the complete rest, and has taken prussic acid and digitalis. There is now no difference to be detected between the radials, and he has regained complete use of the arm; he describes himself as quite well enough to be an out-patient, and finds a bandage which he wears across the chest sufficient to relieve the occasional pains. There is a murmur still in the infra-clavicular region; but all impediment to circulation occasioned by the aneurism has ceased.

The treatment which has been adopted here is an exemplification of the principles which I have taught in the systematic lectures on the principles of medicine, and I must refer you to those lectures for an historical account of the adoption of this practice in the seventeenth century by Valsalva. It is a strict following up of that which nature adopts in all aneurisms that heal spontaneously. In them you find a fibrinous clot formed, and the sac shrunken up from lack of stream passing through it. Here we have tried to make the blood likewise form fibrinous clots, by bringing it into that fibrinous state which loss of blood, anæmia, and low diet induce; and we have tried to keep the blood-stream as calm as possible by rest in the horizontal posture.

The pathology of aneurism shows it to us as a local deficiency of life in a hollow organ, a deficiency of vital elasticity, which has let this hollow organ yield to the continuous pressure of the blood-stream. Doubtless if we could at first have renewed this vital elasticity, such would have been the legitimate aim of treatment, and such would be the course pursued by a rational physician. But here the mischief is already done, the vessel has dilated into an uncontractile sac and is beyond the reach of any of the powers of life. The object now must be to restore as much as possible the original area of the vessel, and to reinforce the weakened walls by an artificial clot; so that though we cannot have a complete artery, we may have as good a substitute for it as circumstances will allow.

There was much in favour of this patient from the outset: the aneurism was in the descending aorta; there was no thrill; his general heath was good; and he is an obedient quiet creature, very different from the ill-conditioned little woman last discussed.

At all events he has done very well; and I should urge upon you to make the carrying out of this principle of treatment the goal of your wishes in thoracic aneurism. You will find patients very often rebel, but do your best; and if you attain not success, you will at any rate deserve it.

I like in general to bleed the patients affected with aneurisms from time to time, and should have employed that mode of treatment if this man had not had the scarlet fever. A former patient of Dr. Sibson's, now an out-patient, testifies from his own observation to the superiority of venæsection over leeches in its calmative influence over an aortic aneurism which he has long had, and on which he is very observant to the effect of remedies. But I have heard an opposite opinion given by patients.

I said you will deserve success, and sometimes you will get it. I kept a stone-mason in this hospital under the bleeding and starving treatment for five weeks. He had come in with a pulsating tumour and aneurismal whiz under the left scapula, with severe pain in the floating ribs, which some thought were being absorbed. At the end of the five weeks he rebelled, and our relation as physician and patient was at an end; but the pulsation had disappeared, and the whiz was scarcely to be heard; and I had reason, therefore, to think the aneurism in a fair way to be cured.

Even in cases where the treatment cannot be carried out *à l'outrance*, good may be done by an approach to it. In 1851, a lady was sent to me by a surgeon in the country, to consult me about increasing corpulence and dyspnœa. In investigating the cause of dyspnœa, I found a pulsation and an obscure whiz under the left clavicle, accompanied by deficiency of pulse in the left wrist. I was satisfied that there was aneurism either of the subclavian or of the aorta at the origin of that branch. But bleeding was undesirable, because she was so fat. I have often told you how badly obese people bear bleeding. Moreover she was sixty years of age. But, as she was a sensible woman, I managed to gain her confidence, and starved her for several weeks, giving her at the same time drachm doses of liquor potassæ three times a day. The effect was a reduction of her corpulence, a diminution of the pulsation in the tumour, and greater free-

dom of breathing. I did not see her from 1851 till 1856, when, being in London, she called to show herself, saying how well she was. The pulse in the radial artery had not returned; but there was no beating in the tumour, and only a sort of roughness in the sound of the artery. She felt confident herself of the good effect of the starving treatment.

I have taken the opportunity of your having two patients together under your eye to bring the subject of aneurism before you, because of late the objections urged against venæsection in excess and in improper cases have produced a fashion of decrying its use altogether, and especially in thoracic aneurism. Bleeding and starving, it is urged, induce debility and anæmia; that is to say, in physiological language, they lower the force of the heart, and they cause a comparative excess of fibrine over blood-discs in the blood. These are both steps towards the mode adopted in nature to effect a cure of aneurism, and perhaps of some other diseases also. So that, I contend, not merely is it the best mode, but the only honest mode, of treating aneurism of the trunk-vessels; because it is the only one we at present know consonant to reason and experience.

(*Clinical, St. Mary's, February 20th,* 1863.)

Thomas W., aged thirty-nine, a decorative painter, had always enjoyed robust health till the 4th of this month, when he was standing on a ladder graining a shop-front. Without any warning or previous feeling of illness he suddenly lost his senses and fell down. On coming to himself after a few minutes he found he was not paralysed in any part, but had severe pain in the side. This he attributed to the fall, and thought that he had broken a rib. No fracture of the bones however could be found, and the pain in the side appears to have been treated as for pleurisy caused by the injury, the most natural diagnosis under the circumstances. On his admission to the hospital on the 11th, a week after the accident, the whole of the left side of the chest was dull on percussion before and behind, and there was entire absence of breathing except in the two upper inches next the collar bone, where it was bronchial, the sough of expiration

being very prolonged. There was no pulsation or heart sounds perceptible in the cardiac region, the organ being pushed over to the right side beyond the median line. A blister was applied to the left side, and on the 14th the heart was much nearer to its natural place than before, and the breathing in the upper lobe of the left lung more normal. He said he had less difficulty in respiration, and no pain in the side. I still continued to hold the original diagnosis, and supposed the pleuritic fluid to be in course of absorption.

He continued going on well till the night of the 15th when he suddenly jumped up exclaiming that he was dying, put his hand to his side, fell back deadly pale and soon ceased to breathe.

The post-mortem examination has explained the mystery. You see here in the descending portion of the thoracic aorta just above the diaphragm the sac of an aneurism large enough to hold a man's fist, out of the left side of which a smaller sac about as big as a chestnut protrudes towards the left pleura. And in this smaller sac there is a rent a quarter of an inch long, which allowed the blood to flow freely out into the cavity of the pleura, and to fill it up with between five and six pints of blood. The blood had so far separated into serum and coagulum that the fluid which first issued on opening the chest was about as clear as that which you find in a bleeding cup carefully put by; it was hardly at all stained red. The heart was not at all injured by its dislocation, though lying entirely to the right of the cardiac region. The left lung was very little pervious to air, being sodden and inelastic in tissue. The pleura was quite natural, showing no signs of inflammatory action.

I need hardly say that no suspicion of the true state of things crossed anybody's mind during the patient's life. The mode of death is so rare, that if an exactly similar case appeared to-morrow while this one was fresh in my mind, I think I should make the diagnosis I did here, of a collection of pleuritic fluid from injury to the pleura or lung. Even during the autopsy a gentleman present, with a juvenile objection to being wrong in a diagnosis, upheld the idea of its having been originally a case of serous effusion, into which the aneurismal sac had burst at the time of death. Tempting as it is to prove oneself right after all, I was compelled to differ; for had such been really the

case the blood suddenly mixed with the previously collected fluid would have stained it all deeply, and not have been seen separated into serum and crassamentum, as it was, on opening the pleura.

I feel sure that the aneurism first burst at the time of the man's accident. Then that the prone posture and the fainting allowed a fibrinous plug to stay further mischief for a time; and that the giving way of the plug was the immediate cause of death.

This case shows how imperceptible and with how little injury to health may be the growth of a large aortic aneurism—even one extensive enough to have eroded the vertebral column as this has done. The patient did not know what illness was till the rupture took place. And perhaps that was a consequence of the fall in a fainting fit. Do not let this discourage or terrify us with the fear of carrying, without being aware of it, such a dreadful inmate in our chest. Let us rather comfort ourselves with the assurance, that if it has wrought so little harm when not known of, it may be prevented from doing harm when it is known of, if prudence is used to avoid accidents. A clot inside this sac would have completely restored the form and functions of the aorta.

Even with a rent a quarter of an inch long in it, you see it was not necessarily fatal. The patient lived nearly a fortnight, the blood first poured out was beginning to be absorbed, the heart was returning to its place, and the lung to its breathing. If we could have seen what was going on inside, there would have been nothing extravagant in the hope that a permanent stoppage of the hole might have taken place; though, of course, the risk of the fatal accident which has really happened would have been equally clear to us.

(*Clinical, St. Mary's, December* 12*th,* 1863.)

Alfred D., a carpenter, aged thirty-three, enjoyed general good health till three months ago, when he became an out-patient for a constant distressing cough and shortness of breath. This state of things became worse and worse, and he was sent to bed under

my care, November 11th. It was then found that the pulse in the right wrist was very much smaller than in the left, an abnormal degree of pulsation was felt in the hollow above the collar-bone, and a characteristic whiz, as of an aneurism, could be heard where the pulsation was strongest. I believe all who examined him came to the same conclusion, that there was an aneurism of the arteria innominata, or at all events involving the arteria innominata, and pressing upon the trachea. The diagnosis was too clear to be of much interest. The lungs were very much congested, coarse and fine crepitations being heard in various parts, and the finer crepitations especially in the lower lobes, of which the right, on percussion beneath the scapula, was duller than the left. The patient was harrassed by constant dyspnœa and frequent cough, especially at night, and had severe pain, sometimes spasmodically aggravated, in the neck behind the right collar-bone. There was copious muco-purulent expectoration.

To relieve the afore-mentioned pain, general bleeding from the left arm was once resorted to, and several times leeches were applied above the clavicle. The patient said that the leeches gave the most relief; an assertion different from what I have heard made in other cases of aneurism of the trunk vessels, and I am sorry to say I cannot explain the discrepancy.

Digitalis and lobelia were also administered internally, and blisters and mustard poultices were applied externally; but I cannot say that either gave any relief to the cough or dyspnœa; and indeed a week before his death they were left off as apparently inefficient remedies. Morphia alone and the afore-mentioned leeches seemed of any advantage.

A week ago he had an attack of hæmoptysis; but that was arrested by leeches, and he went on without much change, varying in his fortune from time to time, now better, now worse, till yesterday. In the morning he told the sister of the ward he thought he was really improved in health, and that he could lie down easier in bed. But after dinner he experienced great difficulty in breathing, said he felt he was dying, sent for his wife and mother, and became livid and insensible almost before they arrived. To-day you are going to see the post-mortem examination.

[*Extract from record of post-mortem examination* by Mr. Nayler, curator to St. Mary's Hospital Museum :—"The aorta in its ascending and transverse portions was greatly dilated, and involved the origin of the innominata artery. Its coats felt also somewhat hard and brittle. In consquence of its increased size, the aorta rose much higher than natural in the chest, and obscured the root of the innominata. On laying open the trachea, its upper part was found to be healthy, but in its lower half the mucous membrane was much congested, and its rings flattened, and at this point they appeared to have undergone partial absorption. The heart was soft and thin. The lungs were very full of blood, and at the back part were not universally crepitant."]

The cause of death doubtless was a sudden increase of the congestion of the lungs from the interference of the dilated artery with the pneumogastric nerve, perhaps especially with the recurrent branch. Probably the only chance of relief for him would have been a recurrence of the hæmoptysis which was of use a week ago. I should have practised bleeding and leeching more assiduously, had not the weakly pulsation of the heart given a warning against it, and made one doubt if life would be prolonged by that expedient, while complete renewal or cure was out of the question.

Do not set down loss of blood as a mere destructive agency, pure and simple. The more perfect and accurately graduated form of it exhibited in hæmoptysis, and our rough imitations with lancets and leeches, by relieving the congested lungs of a burden that impedes their functions, cause more new blood to be made than heretofore, and so are an indirect renewal of life.

You may observe that this man has had a considerable amount of digitalis, and that no beneficial result has been apparently produced by it. I must therefore say something justificatory of myself for administering it. My reason is, that digitalis seems to me to exert a special influence over involuntary muscular fibre, causing its contraction to be more firm and powerful ; and that it exerts this influence most especially when the muscular fibre is abnormally lax, or when it is degenerated. Cats killed during the action of digitalis were found by Dr. Handfield Jones, in experiments he made some years ago, to

have the heart strongly contracted. In the human subject I have, ever since I have been physician to St. Mary's, hardly ever omitted to give digitalis to cases of thin dilated heart, with irregular failing pulse; and the general result you have often seen to be, that the pulse grows firm and regular. Digitalis acts also upon the involuntary fibres of the uterus, renewing their tone, bracing them up, and stopping the menorrhagia of relaxation. You have several times had an opportunity of seeing menorrhagia stayed in this way, and notably one case admitted under my care rather more than a fortnight ago, which I especially mention now, because other involuntary fibres than those of the uterus were influenced.

Emily T., a quadroon nursery-maid, out of place from illesss, aged seventeen, was admitted November 27th, suffering from menorrhagia, which had been almost constant for about three months. The quantity of blood lost was not large at any one time, but there was a continuous drain which had weakened her very much and rendered her very anæmic. Her mother, a tall and stout mulatto, stated that the disease was hereditary, she having herself been laid up in the same way when a young woman. The girl's uterus comes down very low in the vagina, almost to the hymen, and the os uteri is soft, tumid, and painful. There is also pain on pressing the region of the ovaries. She stated in addition, and the statement was confirmed by her mother, that from childhood she had been afflicted with incontinence of urine, and never remembered to have passed a night without wetting her bed. Infusion of digitalis was prescribed, and the dose gradually increased up to two ounces every three hours. At this point it was left off, for nausea and faintness with loss of appetite were induced, and the menorrhagic discharge ceased. It has since returned once for a few hours, but was immediately checked by a resumption of the digitalis. So far the course of events was the usual and expected course; but the next observed phenomena is to me at least new; the patient states that the incontinence of urine has quite disappeared since the night before the arrest of the menorrhagia, that for the first time within her memory she has been able to hold her water during sleep, and now has not wetted her bed for ten nights.

The beneficial action of digitalis over the sphincter of the

bladder is of a piece with its action over the uterus, and is truly not surprising. I was not aware of it before, but shall certainly test it again, both in this girl in case of a return, and in other instances of that most unmanageable disease, incontinence of urine in the female.

This digression is for the purpose of excusing my hope that digitalis might prove of use to the dilated and relaxed muscular fibres of arteries. The hope may be grounded on imperfect knowledge, and was disappointed in this instance; but it is not an utterly irrational one, not a mere excursion into the realms of empiricism.

LECTURE XXV.

DISEASE OF HEART.

1st Part. *Comparison of injury to life from the two sets of valves, severally—Deductions from autopsies—Case in point—Treatment calmative and restorative. Second case—Diseased mitral and aortic valves with dilated parietes—Treatment similar to last case, with certain additions.*

2nd Part. *Degree of importance to be attached to the different points ascertainable by ascultatory diagnosis—Consequences of valvular disease different in different classes of life—Cases in illustration of its effects in the upper classes as distinguished from hospital patients—Causes of difference—Treatment of patients with disorganized valves—Avoidance of dangers—Iron—Chloride of sodium—Hydrochloric acid—Abuse of alcohol—Danger of rupture of valves—Case—Angina pectoris—Pathology of dilatation—Explanations to patients—All diseases of heart to be viewed practically as one.*

(*Clinical, St. Mary's, December 20th,* 1861.)

In speaking of diseases of the cardiac valves I practically intend what is said to apply only to those of the left side of the heart; for the tricuspid and pulmonary are seldom affected alone with such severity as to produce either symptoms during life, or lesions recognisable after death; so that physicians know very little about them. It is the mitral and aortic valves whose alterations we are best able to recognise by physical signs, and whose defects cause injury to the muscular walls of the heart. They are a source of anxiety to us in our daily duty, whereas the others are rather a matter of curiosity.

Comparing the different valvular lesions of the left heart, with regard to the injury they inflict, and the consequent proportionate goodness or badness of the prognosis to be formed, I find that the worst cases, that is, the most liable to have serious consequences, are those in which both the aortic and mitral valves are simultaneously imperfect; the next worst are those in which the aortic have suffered; and the most favourable are those where the mitral alone are inefficient.

Thus I find that in 115 cases recorded in the 'post-mortem book' at St. George's Hospital from 1840 to 1850, where disease of one set of valves was accompanied by alteration in the cardiac walls, the aortic valves alone were diseased in 64, the mitral valves alone in 51. And in the former case also the alteration had assumed a more marked character; for in cases where the aortic valves alone were diseased, the size of the cavities was disproportionally large in comparison with the enlarged walls in 36; whereas, when the mitral valves alone were diseased, the disproportionate enlargement occurred in only 18. And this difference, it is to be observed, is not dependent on the greater frequency of lesions of the aortic valves alone, for in point of fact they are not more frequent. Thus in hearts whose walls were still normal, there was more or less lesion of the mitral valve in 34, of the aortic in 30.

The powerful influence of the double lesion (*i. e.* of both valves at once) is shown by its being found with healthy heart-walls in only 6.

Now this diseased state of the heart's walls is so very much the most important, and so very much the most frequent of the evil consequences of disorganized valves, that practically speaking it may be taken to represent the whole of those consequences. All our calculations of prognosis in cases of valvular injury need have reference to it alone.

I have been hitherto quoting from my systematic lectures on the practice of medicine, *apropos* of a prognosis I have given of a case now under your eyes, and which I have selected as one promising enough to use as an illustration of treatment.

A. J., aged thirteen, had rheumatic fever three years ago at Brighton, of which illness she has not much recollection, but she shows marks on the cardiac region of leeches, probably

applied at that time for inflammation of the heart. She has since then always suffered from palpitation on the slightest exertion, or on any emotion; and she has dyspnœa on attempting to go up stairs or up hill, or to walk above her usual pace. She had an attack of spitting of blood eighteen months ago, but otherwise her health has been good. Her complexion and appearance fully bear out this statement; she is fresh-coloured, muscular, bright-eyed, and plump; her mind is active and intelligent, and though the mammæ are infantile and the catamenia have not appeared, she has the air and appearance of a girl two years older than her real age. I may remark in passing that such a backward development of the reproductive organs as you here see is a very common effect of cardiac disease in both sexes. The growth of the other organs or functions, mental or bodily, does not seem to be retarded.

The palpitations have lately been rather more troublesome than usual, and on examination of the chest they are explained by a vibrating tremor sensible to the finger at the apex of the heart, and at the same point a very loud systolic murmur. The second sound is loud and sharp. The interval is clear. The systolic murmur is heard only very indistinctly at the base of the heart. On admission the pulse and heart-stroke were uneven in strength, but have by rest in bed become nearly natural.

On percussion the dulness of the cardiac region does not appear to extend beyond the breadth and height which is usual in the normal state.

This girl appears to labour under lesion of the mitral with healthy aortic valve, one of the varieties of cardiac injury the least likely to cause enlargement, and therefore the least injurious of any; and since I cannot find that the heart is as yet enlarged, let us give her the benefit of the doubt, and hope that it may not become so.

In the treatment, the first object is to restore regularity and calmness to the affected organ. With that view she has been kept lying down for a week; she has had once two leeches and once one leech applied beneath the left breast, and has taken five minims of tincture of digitalis three times a day. This has been so far effectual, and will be continued only a short time longer.

The next object is to keep the blood in as rich and nutritious a state as possible. The child has a critical period of her life to go through sooner or later, the time of puberty, when there is a call upon all the powers of growth. If she gets anæmic then, the heart will but too surely enlarge by dilatation. I have begun therefore giving her iron from the first, and shall urge its continuance as long as I can keep sight of her.

The richness of the blood, instead of increasing the chance of hæmoptysis, as you might have imagined, diminishes it. Thin watery blood easier oozes out; and besides, the more nutritive the circulating fluids, the more active is the heart, the better it empties itself, and the less is the blood kept back in the lungs.

Another case in the same ward is not quite such a hopeful one. Mary K., aged twenty-two, single, has been here since November 25th. She says that she has had rheumatic fever once this time seven years. She had no pain in the chest then, and perfectly recovered, remaining well till an attack of what she calls "bronchitis," three years ago. After this again she was quite well till two years since, when she began to suffer from severe pain in the cardiac region, and had frequent colds. She also frequently had bleeding at the nose, and spitting of blood, even when keeping quiet, and when she moved about experienced much dyspnœa and palpitation of the heart. She however continued in service, and did her work. Six weeks before admission she observed that she got blue in the face, and suffered more than usual from dyspnœa, so that three weeks before she was obliged to give up work.

When you first saw her she was very blue in the face, and could hardly get her breath; she was spitting blood, and there were loud sibilant and crepitant râles all over the lungs without any localized dulness on percussion in the pulmonary regions. The pulse was very irregular and intermittent. The cardiac region was dull on percussion up to the interval above the third rib, and as far as the sternum towards the right side. The second sound of the heart was scarcely to be heard at all, but was replaced by no murmur. There was a loud systolic murmur loudest at the apex, and followed by a peculiar chirping sound, rather anterior to the time of the second sound. The intervals were imperfectly marked.

In Mary K. there is probably regurgitation through both aortic and mitral valves. What she has suffered from is obstruction to the passage of blood through the lungs, and consequent non-aëration and venosity. She had some hæmoptysis which gave relief, so I took the hint and cupped her, and put on some leeches several times, which have also given relief. The irregularity and excitability of the pulse have been successfully treated by digitalis.

The venosity of the blood is in great danger of being succeeded by anæmia, especially as her appetite is very deficient. The heart is already enlarged, and I fear it is improbable that she will ever be able to get her own living again; still I think it right to give her iron, and purpose to continue it as long as possible, that at all events she may obtain all the advantage she is capable of receiving. The most unhappy event for her would be degeneration of the muscular walls of the affected viscus, so that they should fail from debility duly to circulate its contents; and I believe the best chance of avoiding this degeneration lies in keeping up the supply of a really nutritious blood.

You may observe that the digitalis was left off several times. This was not on account if its failing in its object of calming and reducing to regularity the irregular heart, for that it effects well; but because, when given in larger doses than five minims of the tincture, it produced nausea and prevented her taking her meals. Now the physic we order on the diet card is at least equally important with that on the medicine card, and you must be careful where you want to renew life not to diminish the means of that renewal. The production of nausea and loss of appetite would do more harm than any action of the drug could do good.

(*Clinical, St. Mary's, December 6th*, 1861, *with additions in* 1862.)

There are always in our wards a few chronically diseased hearts, and I very seldom walk round without calling your attention to one or two as studies of diagnosis.

I notice that when you begin the physical examination of the patient whom you know to have a cardiac complaint, you search

first and foremost for endocardial murmurs, and then you often rest from your labour and say what you have found. You seem to consider that sign as the most essential part of the diagnosis. You are partly right and partly wrong.

This knowledge doubles the value of other future observations about the heart, but standing alone it is of less importance than any of them. While then I willingly receive this report first, I always beg you to go on without delay to further observations.

The importance of the existence or non-existence of valvular disease lies not in the injury it inflicts itself, as in the likelihood of the induction of the other lesions of the heart. If the muscular structure remains healthy, injured valves do not appear capable of causing death. But very surely are they fatal when they are followed by dilatation or thickening or degeneration of the cardiac walls, with their sad train of dropsies, apoplexy, pulmonary hæmorrhage, &c.

In the 2161 post-mortem examinations at St. George's hospital in ten years, the cardiac valves were diseased without the walls of the heart being affected 113 times; but in every case there were other lesions amply sufficient to account for death quite independent of the valves, such as accidents, surgical complaints, cancer, low fever, &c. In one alone, where anasarca from granular kidneys was the immediate cause of death, could any symptom be debited to diseased valves with healthy heart, and that symptom was pulmonary hæmorrhage.*

In the classes of people represented by hospital patients, the probability that valvular disease will be followed by its unhappy consequences is very great. When a patient thus affected leaves the wards, you may expect to see him again shortly, and on each fresh admission with a more severe complaint. Hence the more attentive students you are the worst prognosis do you justifiably form. But you must not apply the same rule to the different grade of society amongst whom you hope your private practice will lie. With persons in easy circumstances valvular lesions exist for years and years, perhaps through the greater part of a long life, and not only not prove fatal, but may fail even to cause symptoms bad enough to make them consult a medical practitioner.

* 'Decennium Pathologicum,' chap. x, sect. i.

To prove to you this fact, I will quote from my private notes some cases of persons in easy circumstances in whom the stethoscope or the history, or both, gave every indication of injury to the valves of long standing, but in whom no inconvenience sufficient to be called illness by themselves has followed.

Defective valves of 57 *years' standing.*—Col. R. S. at eight years old had a bad attack of rheumatic fever, which laid him up for eleven months, and from which his heart has never wholly recovered. At sixty-five years of age he had a very loud murmur with the first sound. The year before he had had an attack of inflammation (congestion?) of the lungs which had left a considerable portion of the pulmonary tissue impervious, for his vital capacity tested by the spirometer was only 150 cubic inches, his height being 5 feet 10½ inches.

Defective valves of 50 *years' standing.*—Archdeacon B. at six years of age, had an attack of inflammation of the heart, and since that time has been subject to irregular action of the organ, often followed by fainting fits. He has for some years lived more generously than he used to do, and suffers much less inconvenience. The action of the heart is irregular and uneven, and there is a murmur with the first sound. He is now fifty-six, well, and moderately active. (Dec. 1861.)

Defective valves of 44 *years' standing.*—C. B. at twenty-eight had rheumatic fever from sleeping in a damp bed. At sixty-three years old (in 1852) he had a marked systolic murmur at the apex of the heart, but considered himself quite well, and is alive now (1861) when he must have long passed his three-score years and ten.

Defective valves of 27 *years' standing.*—T. H. G. at six years old had rheumatic fever. Since then he has had no illness of any kind. In June, 1860, when he was thirty-two, I detected a loud whizzing murmur with the first sound; in July, 1861, the same murmur remained. He is alive and I believe well now. (Dec. 1861.)

Defective valves of about 21 *years' standing.*—C. S., aged thirty-six, in 1855 had a low blowing mitral murmur. He used to have severe palpitations when an under-graduate at Cambridge; he has enjoyed average health since, with the exception of what he calls "colds," that is, a feeling of general malaise, for which

he takes tonics, and is always better for the practice. He is alive and well now in 1862.

Defective valves of 15 *years' standing.*—E. G. in 1846 had inflammation of the chest accompanied by severe pain in the heart. I saw him first in June 1848, when there was a loud musical murmur with the first sound. In December 1848, and in January 1850, the same murmur remained. He is still alive, aged seventy-two.

Defective valves of at least 11 *years' standing.*—R. H., who in 1861 was still alive and forty-two years of age, had in 1850 a blowing systolic mitral murmur.

Defective valves of at least 7 years' standing.—R. A. A., who in 1862 is still alive, aged fifty-three, had a blowing systolic murmur when I saw him in 1854. He is a robust muscular man, in the habit when young of pulling in boat races, to which he attributes the palpitations he now occasionally suffers from.

Defective valves of 7 years' standing.—T. J., aged twenty-three in 1854, had undergone scarlatina at sixteen years old and never any other illness. I could hear a blowing systolic murmur at the apex of the heart, and he had pain in the cardiac region after exertion, but was not otherwise ill. His subsequent history is unknown to me.

Defective valves of 7 years' standing.—D. F., aged twenty-nine in 1852, also had scarlatina at twenty-two years of age, accompanied by pain in the heart and followed by palpitations of six weeks' duration. There was with some beats a systolic murmur loudest at the apex at that period, which was seven years after the reported cardiac affection. His subsequent history is unknown to me.

[*Defective valves of 7 years' standing.*—Miss S. had rheumatic fever from sleeping in a damp bed, accompanied by pain in the cardiac region, in 1856, when she was twenty-three years old. There is a distinct very localized systolic murmur at the level of the aortic valves. She has attacks of angina pectoris from exposure to cold, but with care is able to live like other people. Between April 1862 and July 1863 she had lost no ground, and had only two slight attacks of angina pectoris.]

Defective valves of at least 5 *years' standing.*—F. J., aged thirty in 1856, had then an irregular pulse and a systolic mur-

mur, without any dyspnœa or general symptoms arising from the imperfection of the heart. He is alive now (December, 1862).

Defective valves of 18 *months' standing.*—A. D., aged forty-three in 1850, had had rheumatic fever eighteen months previously. The heart's action was irregular and there was a systolic murmur, but no general symptoms at all referrible to cardiac disease, nor any suspicion that cardiac disease existed. His subsequent history is unknown to me.

Defective valves of a year's standing.—W. H. C., aged thirty-one in 1850, had had rheumatic fever a year before, with inflammation of the heart, but considered that he had quite recovered, and he really seemed to have done so; for his vital capacity was 220 cubic inches, his height being 5 feet 9 inches, so that there was no pulmonary obstruction. There was a systolic murmur, loudest at the level of the aortic valves. His subsequent history is unknown to me.

Defective valves of unknown duration, but at the date of examination without any deleterious effect on the general health.—J. P., aged thirty in 1854, had an intermittent pulse with a systolic murmur loudest at the base and middle of the heart. Unusual exposure affected his chest so as to lay him up with cough, but his general health was good. Subsequent history unknown to me.

G. P., aged twenty-six in 1856, had a very irregular, unequal, and intermittent pulse, accompanied by a systolic murmur. He never suffered from palpitation, cough, or any illness at all. Subsequent history unknown to me.

F. D., aged forty-nine in 1857, had a sawing systolic murmur, but had never had any illness or inconvenience referrible to the heart. Subsequent history unknown to me.

J. B., aged forty-eight in 1856, had an intermittent pulse and a blowing murmur with first sound most distinct at the base of heart. He never suffered from palpitations. Subsequent history unknown to me.

Irregular pulse of long standing without date.—Lord ——, aged seventy-four in 1862, and alive now, with a soft systolic murmur to be heard at the apex of the heart, has a distinct recollection of having an irregular pulse as long as he can re-

member anything. And other old people have told me the same, though I have not kept a note of their cases.

Injury to heart from rheumatic fever of 10 *years' standing.*— T. A. O., aged fifty-one in 1855, had had rheumatic fever ten years previously, and since then frequent "fainting fits" and palpitations. The action of the heart is jarring, and there is extended dulness on percussion, but no evidence of valvular disease. He does not get worse.

You know very well that cases like these are not to be met with in hospital practice or among the paupers in a workhouse. Wherein lies the difference? It is discoverable generally from the histories which these poor people tell of the final breakdown. The tale usually runs, "I was pretty well, or only a little short-winded, till I was thrown out of work and had to live low: then my heart got to beat worse, and my feet swelled." Or "I could always earn my living till I was over-worked last summer," or, "till I caught a bad cold last winter," or, "till I had sit up with my mother who died," and so on. And from this breakdown they never get quite up again, they never regain lost ground. In short, you will see that injured valves are slow to lead to further cardiac lesion in the well-nourished, and quick to lead to further lesion in the ill-nourished; and that the motive cause of their evil effects is anæmia, exhaustion, debility.

Do not look upon this disadvantage of the poor in respect of cardiac disease as merely an universal rule in all diseases. In a good many cases the poor recover easier than the wealthy, and the good prognosis which you have habitually attached to certain morbid states in hospital practice will not be justified in private. Continued fever, to wit, is less fatal in the lower classes, although more common; consumption is less frequently "galloping;" it is more chronic, and more rapidly benefited in their case; again, anæmia is more often found dependent on removable causes, and therefore quicker cured in cottages than in palaces.

The peculiarly fatal nature of valvular disease of the heart among those who live by bodily labour arises from the fact just mentioned of lost ground being never recovered from. The heart is (physiologically speaking) a single organ with the single mechanical function of forwarding the blood, and consisting of a number of unique parts mutually dependent on one another. If

the left ventricular valves are injured, the right cannot take their office, nor the aortic replace the pulmonary. It is a chain, proverbially never stronger than its weakest link. Therefore no relief can be given to a failing part by another part taking its duty; no rest for the purposes of recovery can be taken. The designer of our frames has been here peculiarly sparing of reserve function. Such is not the case in other organs; if one kidney is destroyed, the other supplies its place and as much urea is excreted as before: large portions of lung may be impervious from tubercle, yet the blood be aërated normally by the remainder, and the patient recover of consumption. But in the heart each successive little injury can never be compensated for, and is added in turn to the previous list. The wealthier classes can avoid all the many circumstances which produce these successive little injuries—cold, want of food, over-exertion, mental worry; and so under good advice can keep their imperfect valves from getting worse; but those who depend upon daily toil for daily bread run the risk and suffer the unhappy results.

I said early in the lecture that I did not blame you for beginning your examination with listening for cardiac murmurs, but I do blame you very much if you stop there. The evil import of valvular injury lies in its probable consequence, namely, enlargement of the muscular walls; and it makes all the difference in the world to you and to the patient to ascertain if this already exists. Percussion and palpitation are a much more necessary part of the examination than mere listening with a stethoscope. If the heart is dilated or thickened, or dilated and thickened, your ascertaining the fact makes all the difference in the world to your prognosis and to the hopes which you have that your treatment may be successful.

It is obvious that in the treatment of the disorganized valves themselves, restorative medicine in the strictest sense must be quite at fault. The renewal of the destroyed tissues is impossible, and equally so is any compensation for the arrested function. But indirectly it is almost as effective in prolonging life, as if it could put in a new valve, or make another muscle do duty for the resting ventricle. It may repair those reparable conditions which are so injurious, and which by bringing on enlargement

constitute the real danger in cardiac cases. In this as in all diseases, try and cure what is curable and trouble yourselves as little as possible about bygone injuries.

Learn from the histories you hear in the wards what are the external causes which have brought on the first affection of the health, and you will thus learn the perils which your patient with valvular injury has to fear. These are, placed roughly in the order of prominence—

fresh attacks of rheumatism;
insufficient food;
mental anxiety;
drinking;
over-work;
} producing anæmia.
temporary violent exertions.

The first danger is to be avoided by warm clothing, dry air, especially in the sleeping room, and a residence in such a climate as does not naturally induce rheumatism. As a rule, high ground is to be preferred to low, and an inland to a sea-side or island abode. A town life, as being more healthily sedentary and avoiding changes of temperature, is rather to be chosen than rural occupations.

During the attacks, if unfortunately they come on, you cannot do better than adopt the full treatment of rheumatic fever, namely, the greatest possible quantity of potash and sufficient doses of opium, as more largely set forth in my lecture on rheumatic fever. And you must leech or cup the cardiac region, if there is any pain there indicating the probable presence of fresh endocarditis or pericarditis.

But do not let the licence you give yourself of local blood-letting to a moderate extent for the relief of an acute condition, which you fear may aggravate existing evils,—let not, I say, this licence lead to your adopting the old "heroic" practice of thinking to cure established valvular injuries by continuous bleeding, like our forefathers Albertini and Valsalva. They fell into the mistake thus; they first supposed every enlarged part was over-nourished, or hypertrophied; then they thought that the best thing to prevent its over-nourishment was to under-nourish it; and then finding that bleeding in moderation sometimes lightened a few symptoms, they determined that it did

so by under-nourishing the heart, and that of course the more the patient got of it the better. Under the idea of producing its full influence, they bled frequently in small quantities—the most effectual way of accomplishing the end they had in view, the impoverishment of the blood. With bleeding for such an end it was strictly reasonable to join starvation, as certainly the most direct way of diminishing nutrition. What the results would be of thus deliberately inducing anæmia we can easily guess, for daily experience shows that in none do the hearts so rapidly become enlarged and on none does that enlargement have more baneful effects than [on those people who are subjected to all or any of the causes of anæmia which I have named. Had the Sangrado treatment really been in vogue now in England, I should have certainly ranked it in the first class of the origins of disease in patients with lesed valves.

I have spoken of the poor as without doubt the most exposed to the effects of those agencies which produce or aggravate valvular lesion; but the rich are by no means exempt, and often require the protection of sound medical advice. Even "insufficient food" is not an unknown cause of illness among them; the power to buy it does not always imply the power to eat it. They not uncommonly become anæmic from loss of vigour in the digestive organs. To counteract the risk of this anæmia I usually recommend that persons with affected valves, should three or four times a year take a fortnight's course of iron under the eye of their ordinary medical man, whose watchfulness is needed to prevent excess. The insoluble forms of the metal, such as the sesquioxide, or the finely pulverized metallic iron made by French chemists, or the mistura ferri composita are the fittest for the purpose. Chlorine also in the form of hydrochloric acid baths is a tonic not contraindicated by any circumstances in this case, and is a good accompaniment to the iron. The habitual use of a large quantity of chloride of sodium with food is another way of guarding against anæmia, which can readily be adopted by the patient.

When there is reason to fear that dilatation has already begun, I often join with the iron small doses (from $\frac{1}{20}$th to $\frac{1}{14}$th of a grain) of strychnine. If the pulse intermits, this remedy some-

times exerts its tonic power over muscular fibre by restoring regularity of beat, and thus gives you the satisfaction of feeling the good you do with it. When there is much palpitation on occasion of slight nervous excitement, especially if that is joined with unevenness and intermittence of pulse, a few small doses of digitalis are useful. Strange it is that this drug, which makes a healthy heart first intermit and then stop altogether, should bring back to order the organ when it is weak and beating irregularly! We can only account for the seeming anomaly by supposing it to act as an anæsthetic upon the cardiac nerves, withdrawing them from normal and needful stimulation in the first case, and from abnormal and hurtful stimulation in the second. The worst aspect of digitalis is, that its benumbing influence extends not to the heart alone, where it is wanted, but to the whole tract of the pneumogastric nerve; it reduces the appetite and produces nausea; so I pray you to be cautious and not to continue it longer than necessary.

While you bid your patients live generously, you must take care to disabuse them of the notion that the advice includes excess in alcohol. Alcohol is really the most ungenerous diet that there is. It impoverishes the blood, and there is no surer road to that degeneration of the muscular fibre which is so much to be feared. And in heart-disease it is more especially hurtful, by quickening the beat, causing capillary congestion and irregular circulation, and thus mechanically inducing dilatation of the cavities. Let the alcoholic drink be limited to that quantity which increases the appetite, and fills but does not hasten the pulse. In a great many instances this quantity may be very shortly written down —0.

To mental anxieties perhaps their social relations expose the rich quite as much as the poor, and their education makes them more sensitive. Both joys and sorrows affect them more deeply, and instead of balancing one another do equal harm. Happiness is as hurtful as misery. For example, I have a patient whose first attack of dilatation arose from grief at his first wife's death, and his second during the honeymoon of her successor. But alas! ungrateful discontented man seldom lets the blessings he is daily receiving affect his emotions so deeply as his occasional misfortunes.

By overwork as a cause of anæmia, I mean too long-continued wearying toil either intellectual or bodily. I would have you distinguish from it short extraordinary exertions, to which we can sometimes, though not very commonly, trace injury of the valves.

Now and then a case occurs showing the possibility of a valve being ruptured by its own forced action. Thus I remember seeing one of Tattersall's stablemen under Dr. Nairne's care at St. George's Hospital, who distinctly traced his first cardiac symptoms to a sudden pang which he felt, when running a fast horse down the yard a year before. After death two of the pouches of the aortic valve were found torn, and from the regurgitation thus arising the ventricles had become enormously dilated during the year that he had lived. But the torn portions were not of normal structure; the tissue was thickened and opaque, and therefore wanting in elasticity or power of resistance. And I believe this always is found to be the case in valves ruptured by violent strains; I am not aware of any instance of healthy valves having been found broken.

Where the tissue has become bony and brittle, rupture is more common; but then of course it will have been preceded by a long course of ill-health, for such an advanced lesion as ossification could not exist without seriously incommoding the individual. You will not be long without seeing in the dead body the cords of a mitral valve thus broken, rather from the quantity of lesion than from any external strain or violence.

More common still are cases that you see during life of sudden pangs from exertion—such as race-rowing, jumping, fighting,—sudden pangs followed by increased palpitation, and other signs of aggravated enlargement of the heart. Yet the aggravation is not such as must surely accompany a broken valve, nor is the path to death so straight as it was in the case which I have related to you. Moreover, in some instances where an autopsy reveals that the valves are whole, you had previously heard a history of such pangs, and sometimes had seen them in the wards. What is going on in the heart during these fits of angina pectoris no one precisely knows, but it seems to me very probable that its state is one of temporary dilatation. The pain has the same tearing and paroxysmal character that you find accompanying the distension

of hollow fibrous organs usually insensitive, such as the stomach, the colon, the bladder.* And the consequences too are similar as well as the pain; that is to say, like the bladder or the stomach, the heart may completely recover in one case; or in a second, it may be completely paralysed and cause death; in a third, it may remain partially powerless and dilated. As in the bladder, so in the heart, any one of these results may follow.

Having said so much about the nature of injury by sudden strain, it is needless to remark that it is to be avoided by all the expedients that lie in the patient's power; and perhaps the best way of strongly impressing upon him (if he is a sensible man) the importance of your advice, is to explain, that is put into plain words, the pathology of the case. I cannot agree with those who would make a mystery of our science. I am sure that we are never called upon to pervert the truth, seldom even to be passively reticent, and that the most thorough openness is always the best policy. To this end a complete explanation is generally necessary. The patient must be told how erroneous are the vulgar notions derived from popular fiction about the extreme deadliness of organic disease; the true facts of the case must be stripped of their picturesque hangings, and he must be led to look upon his condition with the same business-like reckoning of results as a physician. Unless this is done, your half truth will act as a lie.

I should strongly advise you to get a habit of giving these clinical lecturettes in clear untechnical words. Let your pathology shape itself within your own minds in such language as all educated persons can enter into; and not only will you be able to explain matters more easily to your patient, but you will understand them better yourself. For this last statement "experto crede."

In practical lectures it is always wisest to take chronic diseases of the heart as one individual subject, for this is the way in which you have to think of them at the bedside. You should

* The pain is of the same nature as that felt in over-strained tendons, or muscles wearied out by sustained efforts; it appears associated with the stretching of usually insensitive fibres, and is sometimes the most dreadful agony the body can bear, as the inventors of racks and other instruments of torture well know.

not treat patients with spoilt valves on one principle, those with dilated ventricles on another, those with thickened ventricles on a third; but, as I have tried to make you think, each and all with a reference to the same function impeded in the same manner. Division leads to unnecessary repetition, and you may observe that I am careful to avoid it both in the way in which I class the patients in the wards for instruction, and in the extracts I make from case-books for the lecture-room. I do this with a design of impressing upon you what I consider the main points in the management of diseased hearts, viz.—

1. The importance of valvular lesions consists in their liability to cause enlargement of the heart.

2. In auscultation we should strive more to find out the state of the heart-walls than of the valves.

3. The danger of enlargement is greatest where the muscular fibre is weakest.

4. The muscular fibre is weakest where the blood is most anæmic.

5. The principal object therefore of treatment is to avoid anæmia.

(*Clinical, St. Mary's, January* 30*th,* 1863.)

Eliza M., an unmarried woman aged twenty-six, has been in the hospital four times during the last three years with attacks of hæmoptysis and dyspnœa, arising from valvular disease of the heart. She was last admitted January 16th, with dyspnœa accompanied by excessive lividness of the face. She was soon relieved by the recumbent posture and half a dozen leeches to the cardiac region. My reason for mentioning the case to-day is to draw your attention to the dyspeptic symptoms which seem dependent upon the disease of the heart. On admission she said that she vomited up all her food, and although she only did that once after coming into the hospital, still she suffered from constant nausea after eating and tympanitic distension of the intestines. I have often found this form of indigestion in cases of heart affection. There is nausea, vomiting, sometimes a great

collection of mucus in the stomach, and intestinal flatulence. I attribute the nausea and vomiting partly to the constant jar communicated to the walls of the stomach by the palpitating heart, and which acts somewhat as the rocking of a ship produces sea-sickness. Partly also I think it may be due to the general venous congestion which I have no doubt exists equally in the mucous membrane and in the external skin. The flatus in the digestive canal I think arises from the deficiency of absorption produced by congestion of the portal system.

You must not look upon wind as a purely abnormal denizen of the alimentary canal. It would be a very abnormal state of things indeed if there were none found there. The greater part of it is carbonic acid and atmospheric air derived from the food. But in health its quantity is limited and kept from inconvenient excess by its continuous passage by endosmosis into the portal and venous blood. Now it is a familiar law of osmosis that the ratio of the rapidity of its current bears a direct relation to the motion of the fluid towards which it sets. Obviously then, obstructions to the circulation, by diminishing the quickness of the moving blood must impede absorption and so allow the flatus to accumulate. It must be viewed as a collection not as an effusion.

As regards remedies, I have found hydrocyanic acid have a beneficial effect. And in this case especially to give it is to accomplish two indicata with the same agent; for by its general action upon the pneumogastric nerve it alleviates the dyspnœa, at the same time that it deadens the oversensibility of the gastric plexus in special.

LECTURE XXVI.

PURPURA.

Descriptive definition of purpura—Case 1. *Young man affected with fatal hæmorrhage and purpura without previous disease*—Case 2. *Menorrhagia and purpura in a girl otherwise healthy*—Case 3. *Purpura in a fatal case of diseased heart and kidneys—Pathology of purpura—Its connection with lesions of the circulating system—Its treatment based on its pathology—Cautions respecting the administration of digitalis.*—Case 4. *Purpura fatal by hæmorrhage into the brain.*

(*Clinical, St. Mary's, February 6th,* 1864.)

I wish to call your attention to-day to three examples of purpura under my care this week, which illustrate the phenomenon under several different aspects.

Purpura, or "the purples," consists of a diseased state of the capillaries, which causes them to rupture idiopathically or of their own accord, just as they would do in consequence of local violence. On soft, or loosely constructed surfaces, such as mucous membranes, the escaped blood flows away in a fluid state; where a tougher structure prevents this escape, as in the external skin for example, it forms purplish black spots of rounded shape and various sizes; in parenchymatous or semi-parenchymatous tissues, such as the brain or lungs, it may collect into masses which lacerate their substance and obstruct their functions.

Case 1. John K., a labourer, aged thirty-five, previously quite well, was taken ill at tea-time on January 29, with bleeding from the mouth. This hæmorrhage rapidly increased and became very profuse; so that by the evening of the 1st instant,

when he came up by railway to St. Mary's, he reckons that he lost a gallon. And indeed it was very copious, for on each of the first two days of his being here there was very nearly a pint of fluid, exactly like pure blood, with a vermilion froth on the top, in the porringers by his bed-side. But a good deal of saliva was mixed with it, so much at least as to prevent its coagulation, except in very small broken clots. On admission his mouth was full of clotted blood, which adhered to the gums; on the tongue were half a dozen black vesicles of the size and shape of split peas, and blood was oozing from their edges. On the lips and face, on the hands, arms, and various other parts of the front of the body, were numerous black spots of about the same diameter as those on the tongue, but not raised above the surface. His urine contained blood and, of course, albumen; but I could not find that blood had been passed from the bowels. He said he felt weak and tremulous; but he had walked to the hospital, and he sat upright, waiting for a bed to be prepared for him, for some time without faintness. There was colour also in his cheeks and lips, and altogether much less exhaustion than one would have looked for after such severe hæmorrhage. His appetite was not affected, and the bowels were open naturally without medicine.

He was ordered ice, sulphuric acid and turpentine draughts, and "teacup diet" of milk and beef-tea, with a wash of logwood, catechu, and sulphuric acid, for the mouth.

On the 3rd there was little if any improvement in the local symptom, but his colour and pulse had not failed. He was bidden, in addition to the previous treatment, to keep in his mouth a lump of ice smeared with powdered tannin.

On the 4th the hæmorrhage from the mouth was not lessened much; there was about three quarters of a pint of froth-covered blood. It was stained brown by the local applications—in fact tanned. The pulse was quicker and weaker, about 108 in the minute and uneven. An ounce and a half of infusion of digitalis was ordered to be taken every third hour, and the sulphuric acid and turpentine were left off.

On the 5th (yesterday) the pulse was 120 in the morning, 110 in the afternoon, regular, even, and narrower than on the previous afternoon. The hæmorrhage was not diminished.

Sore throat, faintness, and nausea, were complained of. After he had taken six doses the digitalis draughts were given every four hours only.

Late last night the breathing became short and difficult, and he died early this morning. Our secretary telegraphed to the poor man's wife at the village where they lived. The telegraph-clerk was unable at first to deliver the message, there being several people of the same name in the place; but hearing that a few days before a man bleeding much from the mouth had gone by train to London, he tracked him backwards from the station to his cottage by the blood which had been spat upon walls and stones by the way-side. This shows that the account of the excessive hæmorrhage before admission was not exaggerated.

[A post-mortem examination was made on the 8th, two days and a half after death. The whole front of the body was covered with spots of purpura, of which those on the chest had pale yellow centres. The rest of the skin was very pale, and there were very few spots on the back. There were numerous spots of purpura on the pleura, pericardium, small intestines, bladder, bronchi, trachea, and larynx. In the upper part of the latter organ they became more numerous, and in the fauces and tongue formed a continuous discoloration. On the tongue they were black and swollen as before death, and from the pillars of the fauces blood oozed on their being handled. There was no purpura on the œsophagus. The left auricle contained a firm non-adherent clot of fibrin, and there was another similar clot loose in the aorta. The heart was hard and firmly contracted. The ventricles are preserved unopened. The other viscera were quite normal in appearance.]

Case 2. Jane N., aged nineteen, spinster, came in on January 29th. She has a transparant ivory complexion, firm large limbs and muscles, and an aspect of strength. She has always enjoyed good health, but during the last three months the catamenia have been very profuse, and have gone on lasting longer and longer each period, till now she has hardly a week's interval. During the week before admission she several times found blood in her mouth, and on the 26th purple spots came out on the face, arms, bosom, and legs, and continued to increase in numbers daily. They were of sundry sizes, from that of a mustard seed up to that of a pea, the smaller being far the most numerous. They were of an intense purple colour, and presented a singular appearance from their striking contrast with her clear waxy complexion, the hue being perfectly complimen-

tary. Their surface was not raised above the neighbouring skin. I saw none on the mucous membranes of the mouth, but her gums looked a little red at the edges.

Her bowels were regular. The urine could not be examined on account of the presence of the catamenia. She had lost her appetite, but I think that was accounted for by her sorrow at parting with her mother and coming into a hospital, as she has eaten fairly since she has found it to be not such a terrible place as she fancied.

She was ordered the following:—

℞ *Dilute sulphuric acid min. xxx,*
Tincture of digitalis min. xv,
Camphor water fl. oz. j.
every 4 hours.
A teacup of milk or beef-tea every 2 hours.

On the morrow I found her appetite was not so entirely lost as she said; so I ordered her broth and meat, potatoes and a lemon, and on February 3rd ordinary meat diet.

Twenty-four hours after commencing the medicine I pointed out to you that the centre of each spot was lighter than the circumference. It became distinctly yellow to the naked eye, and the dark colour gradually faded away altogether by February 4th. The sanguineous discharge ceased at the same time. She is quite convalescent, but I observed that after an interview with her mother yesterday she was paler in the lips and depressed in spirits; so I shall keep her in a little bit to watch against a relapse and give her a good rest.

Case 3. William H., a butler, aged forty-five, was admitted on January 29th sinking with emaciation, anæmia, and pain in the cardiac region. The anatomical lesions found at the post-mortem examination on February 3rd were a dilated heart, with its mitral valve degenerated into wart-like growths, and kidneys atrophied through the occupation of their substance by many curiously large cysts.

The imperfection of the mitral valve had been known before death, but that did not explain the disease; and the circumstances prevented any further diagnosis, or much association of the symptoms during life with the appearances on dissection.

The chief causes of death do not therefore offer a profitable opportunity of clinical instruction, and I cite the case to-day to notice a secondary phenomenon. Two days before death there appeared a large blotch of purpura on the nose, occupying the greater part of the feature, and another spot on the left hand, which was slightly œdematous. The discoloration remained in the dead body. The blood was fluid.

These three cases present to you three aspects of purpura.

In the first two the disease was due to a marked loss of function in the capillary vessels, so that their coats were ruptured, and the contained fluid oozed out. In the first danger arose from the accidental location of this oozing in a loose surface, so that the hæmorrhage was excessive. In the second there was no danger at all. In the third the deficiency of the capillaries was at a minimum, and would not alone have given rise to extravasation; but it was supplemented by the impediment to the circulation in the heart, and probably by the retention of urea in the blood. It was in itself unimportant.

Like all diseases of the peripheral circulating system, purpura is most common in the parts most distant from the centre. Such is the rule, though its want of universality is exemplified by the instances before us. But it is not most common in the most dependent parts, and in the legs it appears as often on the front as the back, on the body almost always on the front. This seems to remove its etiology from the category of being primarily traceable to lesion of the central organ of circulation or of the mass of the circulated fluid. Were such its origin, it would appear in cases where the first is most affected, and in places where the latter is most abundant and most unhealthy.

You must not fall into the old-fashioned error, inculcated when I was a pupil, of lazily attributing all illnesses where the blood is abnormal in composition to "diseases of the blood," and there ending it. The blood is like a pond or reservoir attached to some great manufactories: the refuse of the manufacture flows into it, and the engine boilers are fed from it; waste products and latent power are mingled in its streams. If there is anything unusually foul in the water, the master does

not lay the blame of that foulness on the innocent element, but traces it to defects in the processes drained and fed. So in purpura, the circulating fluid is probably always abnormal; but it is surely unwise to stop our explanation at this point, and to search no further. For the hæmorrhage, whether free or into the cutis, makes it abnormal, and the degeneration of the red discs, discernible by the microscope, is just what is found in cases where there is no purpura. It is surely going backwards, when the function we see to be deficient (namely, the retention of the blood) is a function of the capillary vessels, to say that their diseased contents are a cause of that deficiency.

On this pathology is based the treatment. The less severe cases will recover under the use of cool unirritating, but nutritious, diet with vegetable and mineral acids, which astringe the capillaries. I think very possibly the young woman Jane N. (Case 2) would have done so; though not so quickly as she has now done, because mineral acids alone are slow to stop menorrhagia, with which, as well as with purpura, you will remember her to have been affected. But you saw that this treatment had no influence over the dangerous purpura of the first patient, although supplemented by other very powerful astringents. The most powerful remedy taken in both instances has been digitalis, whose agency in diminishing the area of the circulating system (probably through the functions of the involuntary nerves) I have often pointed out to you. Under its use the artery becomes smaller, the pulse-wave is narrowed and hæmorrhage ceases. This happens not only when the hæmorrhage is on the loose surface of a mucous membrane, but when it is subcutaneous.

You saw the purple blotches on the young woman fade away at a marvellously quick rate; and you saw them fade away from the centre, not from the circumference, exhibiting yellow spots in the middle while the rim was still dark, thus proving that the action is not merely peripheral, but internal. At the same time you heard that the vaginal hæmorrhage was equally ceasing, as it usually does in simple menorrhagia under the action of digitalis. In the first related case there is no evidence of curative action, except the yellow centres to some of the blotches seen in the dead body. In the third case the pur-

pura was such an unimportant part of the patient's illness, that it had no treatment at all.

The chief caution which I think it necessary to give you about the administration of this remedy, is that you should provide against the danger accruing from the sudden uprising of the patient. From the diminution of the area of the vessels so much less blood is sent up into the brain, that fatal fainting may ensue if the usual hasty demand entailed by this change of posture is made. The symptoms of deleterious action, and which warn us to suspend the employment of digitalis, are giddiness and nausea, accompanied sometimes by irregularity of pulse. Dilatation of the pupils, cold sweats, and complete syncope, alluded to in your books of materia medica, are later phenomena, which I have not had an opportunity of witnessing, and before the supervention of which you ought to have left off your drug.

Digitalis seldom, if ever, begins to do harm till it has ceased to do good, and till therefore the necessity for it has passed. When the condition for which it may be wisely prescribed has passed away, then, and rarely before then, its poisonous power is exerted. And the more and more the original morbid condition is departed from, so is the novel morbid condition, the poisoning by the drug, developed. Hence its action appears to increase. Metaphorically it may be called "cumulative;" but the use of that word must not lead you to suppose that soluble alkaloids, such as those in foxglove, are likely to accumulate in substance in the blood. The stricter explanation would be that its action is permanent, and therefore that each new dose adds to it.

This account of the action of digitalis affords a reason for the plan, which you see me adopt, of diminishing forthwith the dose, directly that a beneficial effect has began to be produced.

(*Clinical, St. Mary's, February 25th,* 1864.)

Having very lately lectured on the subject of purpura, I shall bring before you, as an addition to that lecture, another case; though, as a fatal one and not seen by you or me during life, it is but little instructive taken singly.

Two days ago a man, apparently of about thirty, was brought in evidently moribund, who was stated to have had "typhus fever." He died an hour and a half afterwards, without having manifested any diagnostic symptoms. At the post-mortem examination yesterday we observed on the dorsum of one foot a small spot of purpura, another at the side of the leg, and a good many more on the back. The largest were about one eighth of an inch in diameter. The skin in many parts of the person was mottled, like that of a corpse when decomposition is commencing, the face was purple, and the scrotum was reddish purple as if bruised. The body was well proportioned, and there was a healthy quantity of firm adipose tissue in the walls of the belly. The heart was hard and large, weighing with the pericardium one pound ten ounces. The pericardium was universally adherent, as if from long-past inflammation, no connecting fibrin being visible. The valves were healthy, and in the cavities were contained the usual fibrinous coagula; there were none in the arteries or veins. No trace of chronic organic lesion was detected in any other organ.

I show you here specimens removed from several of the viscera, which present a singular and uniform appearance, the differences being assignable generally to their different anatomical structure. Here are pieces of the brain, of the liver, and of the small intestines, the kidneys, and the heart. You see scattered over them, inside and out, dark spots of purpura, such as I have described on the skin. This gives a very strange aspect to the kidneys, which look like the speckled belly of a trout. In a few of the spots the fibrin seems to have separated itself, forming a yellow centre to the effused blood. There is no halo of inflammation around any of them. Many of the spots in the liver are more yellow than red.

In the brain the spots are large, and branch out along the course of the vessels on the surface. In the right anterior lobe the nervous substance is broken up by a large black gelatinous clot of blood. It is evidently, as you may feel, of considerable size, at least twice as big as a chestnut, but I wish to harden it in spirit before I make a section. There are two more clots about the size of small peas at the back part of the hemispheres.

No other abnormal appearances were observed, and this clot in the brain is enough to account for death.

The history of the case, which I have since obtained, is as follows:—The patient had previously suffered twice from acute rheumatism, and since November last had been badly off, living principally upon potatoes and bacon, but was in his usual health and spirits on the 18th instant. In the evening of that day he was attacked with sickness, pains in the joints, pain in the side, thirst and feverishness, which symptoms went on from bad to worse. On the 21st he was seen by Dr. Asprey, the medical officer of the Western General Dispensary, and found to have excessive pain in the joints and a brown tongue. In the evening he became delirious. On the 22nd Dr. Asprey found him in a state of partial coma, but capable of being roused by effort, and certainly not anywhere paralytic. The tongue was dry and brown, and the pupils dilated. On the same evening he was brought to the hospital, as I have related, just before he breathed his last.

This case shows how serious may be the consequences of purpura, a condition which, judging from the more ordinary examples seen by us, we are in the habit of rating low down in the scale of causes of mortality.

In such a case of cerebral hæmorrhage as this paralysis and apoplexy were not to be expected, because the central parts of the brain were not pressed upon, the sanguineous effusions taking their origin from and being confined to the surface. I remember the case of a young woman who, after a mental affliction, died with typh-like symptoms not very dissimilar to this man's. There was found in the brain a clot of blood so large as to conceal the greater part of one hemisphere, but it was thin and lay quite on the surface; so that I suppose it did not compress the inner portions of the cerebral substance; for there had been no paralysis. It is not so much the size, as the shape, and still more the situation of clots which make them apopletic or not. A clot, one tenth of the size of this, in the fornix or hippocampi would certainly have been apoplectic.

LECTURE XXVII.

ANÆMIA.

PART I.—*History of a case of anæmia—Objections to the nomenclature of the disease—Its pathology—It consists of a functional deficiency of life in the blood-making organs—Application to this case—The defective morbid anatomy does not impede our treatment—Transitory curable states usually dependent on the mucous membranes, which have little post-mortal anatomy—Sketch of the active life of mucous membranes—Their importance in disease—Effect on health of their diminished vitality—Application of this pathology to practice—Intention of treatment to introduce nitrogenous food, iron, and chlorine—Mode of doing this, its effects, and reflections thereon.*

PART II.—*Effect of anæmia on the mental faculties—Practical deductions.*

PART III.—*Anæmia, when the result of permanent organic lesion, amenable to the same treatment as when functional.*

(PART I.—*Clinical, St. Mary's, November* 15*th*, 1861.)

I AM going to make the common and typical case of anæmia a text on which to hang a few practical observations on that disease.

You will all remember the corpse-like paleness, made all the more striking by red hair, of a girl we first visited this day fortnight, named Margaret C. She smiled courteously, though quite unable to raise herself from the bed, and in answer to cross-examination gave her history as follows:

Her age is twenty, and she seems to have had generally very good health, as is shown by her remembering that she had such

an unimportant discomfort as a pain in the right side when she was a school-girl of seven. She was carefully brought up by a step-father in a higher class of life; but three years ago she lost him, and had to go into service as a housemaid at the age of seventeen. For that work she was scarcely strong enough, and had been too tenderly nurtured; so after eighteen months' trial she gave it up, and was apprenticed to a Berlin-wool shop. There her mental superiority was recognised, for she quickly became forewoman with three girls under her in a shop at Maidstone. She felt the responsibility a good deal, and also thought the closeness of the shop did not suit her, although it did not seem to make others ill. However she retained in her face a high colour, for which she seems to have been somewhat admired, till nine months ago, when she began to lose it, and in a few weeks became as wax-like in hue as she is now. In the first stage of her ailing the appetite was large, so that she always felt in want of food; but after three months it failed, then ceased entirely, and she took a disgust to all nutritious articles of diet. She had a good deal of pain in the epigastrium and to the left side of it, and also suffered from palpitations and pain of the heart. A quarter of a year ago she spat up some blood, and had a little cough, which frightened her much. Thrice during the nine months she has had attacks of low spirits with crying, but there is nothing abnormal in a girl being sad when she is out of health, or in her crying when she is sad, and Margaret C. does not appear at all hysterical now. The catamenia had always been quite regular and sufficient till the commencement of the anæmia nine months ago, when they began to get scantier and scantier, and at last ceased entirely. The urine is pale and watery, the stools are scanty and steadily rare; but there is never any sudden gush of bulky stools, no diarrhœa alternating with constipation, or other indications of accumulation of fæces in the intestines.

The patient expands her chest perfectly, and there are no signs to give rise to a suspicion of pulmonary tubercle, or at all events of tubercle in such a quantity as to account for the anæmia. There was at first a soft systolic murmur in the heart when she was agitated; but it went away after she had rested in bed five days.

First, for the name by which I have already designated this girl's disease. Anæmia, or "bloodlessness," means in scientific

language a deficiency in the red discs in the blood. The word has been objected to, because it has been supposed to imply etymologically that there is a deficiency in the actual quantity of circulating fluid, of which deficiency in quantity there is truly no proof. And "spanæmia," or "thinness of blood," has been proposed in its stead. Such accuracy would be highly praiseworthy, if it were only accurate; but really the mere fact of thinness does not hit the essential feature of the disease; for the specific gravity of the blood might be raised as high as you like, but if you did not restore red blood-discs nothing would be gained; the morbid state would still exist. In truth there is no occasion for fault-finding. "Anæmia" by the analogy of Greek etymology does not mean deficient quantity of blood, but deficient quality, just as it is in Aristophanes, ἀπροσώπος does not mean a man "without a face," but "with an ugly face," ἀναρίθμος means "difficult to count," and so on in numerous instances of the use of the *a* privative. I shall therefore contentedly use the term anæmia to include all cases in which the amount of blood-discs is below the normal proportion.

Anæmia has existed during life in the patients from whose bodies has been taken a great number of the organically changed tissues which you see preserved in museums and shown in lectures on morbid anatomy, and which may also be found out by diagnosis. In other cases of equal import and prominence anæmia is wanting. Again very frequently you find it in a high degree in cases where there can be discovered no organic changes of the solids at all, and where from the transitory nature of the bloodlessness there is reason to conclude that such organic changes do not exist. Under this last category comes the patient who is the occasion of to-day's lecture.

To understand how it is that so many causes are followed by the same effect and by an effect not at all proportioned to the general importance or want of importance of the cause, you must reflect upon the true relation which the blood bears to the rest of the organism. It may be compared to a chief thoroughfare in a great city. Very few trades, still fewer manufactures, are carried on out of doors or in the street itself, yet from the nature, the number, the pace, and other characteristics of the passing vehicles and people, a pretty shrewd notion of the commercial

activity of the population may be formed. An observant foreigner standing in Cornhill and viewing the quick steady pace and careful yet healthy faces of the many classed wayfarers, the well-packed loads of the vehicles, and their varied contents, could not fail to know that he was in the centre of a prosperous trading nation. But it would not be, or ought not to be, the mere numbers of the people collected together that suggests to him the observation. On last Saturday he would have seen a greater crush than usual at the same place, but on inquiry he would have found that it was only in consequence of all business being suspended for Lord-Mayor's day. And at Naples, till lately, the lazzaroni and pickpockets who blocked up the pavements in the main thoroughfare were evidences of trade being not only stopped there, but made impossible by a horde of villains. So that it is not the fact of crowding which should connect the idea of wealth with what is seen.

In the blood the physician traces proof of constructive metamorphosis (the city's manufacturing industry), destructive metamorphosis (its consumption), and effective life (its social happiness) being carried on. But as our intelligent traveller, in estimating the wealth of a community, must not be deceived by an idle crowd at one spot, so the medical philosopher must not set down mere local congestion as proof of wealthy blood. In both experience finds strong presumptive evidence of something amiss.

Neither must a mere bustling throng be reckoned as industrious citizens. There are cases where a large amount of solid matter, even where a large amount of red discs in active motion, adds no more to the usefulness of the circulating fluid than the lazzaroni to Naples, and which therefore, as far as treatment is concerned, are really in the same category as obvious anæmia. Of these I shall take a future opportunity of speaking.

But though crowds are no evidence of sound political health, yet it is certain that deserted streets prove political disease. So anæmia, or deficient redness in the blood, shows a deficiency of life in the ministers to that redness; either the supply of food is too small, or its assimilation is defective; in either case the supply of red discs, either absolutely or relatively, is not commensurate with the existing demand.

In many instances of anæmia it is easy enough to lay the finger upon the instrument of life which is to blame. We detect without difficulty causes at work to produce it—starvation, which anybody can understand leads to an absence of the organic matters made out of food; degenerated stomach, in which the aliments are not prepared for assimilation; degenerated liver and duodenum, producing the same result; lesions of intestines or their glands checking the imbibition of adipose matter, and so preventing cell growth; changes in the spleen or lungs—organs which our physiological experiments, independent even of our observations of morbid phenomena, show to be answerable for the formation of new blood-discs in a way yet unknown; mental derangement, care, disappointment—which so readily arrests the activity of the assimilating viscera; these agencies, and many more, are readily comprehended as causes of anæmia. But there are a many cases where nothing obvious of this sort is to be made out, yet where the paleness of the blood seen in the face, lips, tongue, or in a drop taken from a pricked finger, and where evidences of it in fainting, weakness, palpitation, anasarca, amenorrhœa, &c., are even more marked than where demonstrable lesion is to be found. So it is in the present instance. The young woman's history gives no reason to suspect any organic disease of the lungs or other organs, and the functions of life were fairly performed till she began to get pale and languid nine months ago. The want of red blood, which we look upon as the important feature in her case, also attracted her own attention particularly, as she had previously had an ornamental fresh colour. Then, after an interval amply sufficient to enable us to separate cause and effect, come the symptoms which I wish to notice as the consequences of anæmia. Causes, no doubt, they are in some instances, but here consequences. I mean the loss of appetite, impeded circulation, amenorrhœa, hæmorrhage from the respiratory organs and hysteria in a person previously unaffected in that way, which are noticed in the case-book.

The only explanation she can give of her loss of health is her having been employed in a shop less perfectly ventilated than she had been used to, and having the main responsibility of the concern thrown upon her. Alone neither would have been sufficient, as the shopwomen under her do not appear to have

suffered from the air; while, on the other hand, women engaged in retail business are not as a rule anæmic. But still I think that both together may perhaps be fairly charged with the blame, for while the increased mental labour was increasing metamorphosis, the greater demand was not responded to by greater supply, but on the contrary assimilation was checked by the comparative unwholesomeness of the respired air.

The not being able to trace deeper the anatomical cause arises from the imperfection of our knowledge, but it does not arise from neglecting to apply such knowledge as we possess to practical medicine. If we were to make an autopsy of this patient instead of curing her, we should in all likelihood see no more solid lesions capable of accounting for her disease than we already know of, we should probably find nothing abnormal in any part. So that you need not lament the opacity of your patients' bodies, or suppose yourselves likely to learn how to treat them better if you could see their insides.

Anæmia without obvious organic lesion, when properly managed, is a very curable condition, and this should still further reassure you that you miss nothing by not being able to study its post-mortal pathology. For passing and curable states leave but faint foot prints behind them for anatomists. In a great majority of cases they depend upon morbid changes of the mucous membrane, of all the tissues in the body the one most speedily affected by decomposition after death, and then presenting the worst possible picture of its condition during life.

The intestines, as the anatomist sees them, are about as much like the intestines in health as the crumpled folds of dank parchment which surround the mouth of a corpse resemble the same lips swelling with joy and expression.

Let the picture which is painted on our minds be taken, not from the dead-house, but from the familiar view of our own mouths in a looking-glass; for one sketch drawn from the life is worth ten from the museum. Turn down the lower lip, and observe the infinite life going on. There is evidently as much blood as vessel; and seeing that blood, from the quantity of solid matter visible in it, has a right to be called a semi-solid, this membrane has an equal right to be thought of as a semi-fluid. And when we think of it as semi-fluid, let not the idea

of a stagnant marsh be presented to us, but of a headlong rapid. It is a useful way of keeping lively our feelings about the circulation, to examine through the microscope occasionally the toe-web of the slow-blooded frog. The action and ceaseless whirl of the living stream we see there quite drives us dizzy. What then must it be in our own warm selves! If in a membrane so little animated as the frog's toe, or the bat's wing, which by the naked eye we should judge to be entirely devoid of blood, we still are enabled by our microscopes to see such a network of tubes conveying it—if, in a creature, the greater part of whose blood is driven from the extremities to the centre by the temporary fright we cause in putting him under a microscope, we find such a busy scene of circulation—what must be going on in a tissue glowing with red life and health!

To the fault of the mucous membranes I am disposed to lay the condition in which we find our present patient. The two circumstances to which I have traced the illness both act directly or indirectly on this tissue. The mental exertion involved in an unwonted responsibility thrown on a conscientious person would lessen the life of the involuntary muscles which carry along the mass of food through the alimentary canal. You know well how long your food is in leaving the stomach if you are called to an important midwifery case just after a hearty meal; and several commercial and literary men have complained to me of attacks of vomiting (that is, temporary paralysis of the stomach) when they took dinner alone, and so were apt to let the mind dwell deeply on some interesting subject; and they have told me in wonder that they could dine out and eat and drink all sorts of rich things with impunity. They did not seem aware of the preservative value of frivolous conversation.

At the same time that the moral causes thus impeded digestion, the unwholesomeness of the air in the close shop where our patient was employed poisoned the mucous membranes, diminishing the vitality of their epithelium, and causing them to be abnormally covered with a thick layer of mucus. By this tenacious coating the entrance of alimentary substances into the veins and absorbents was impeded, and the owner pined in the midst of plenty. So all the usual signs of starva-

tion followed. First, hunger,—by no means a constant companion of chronic deprivation of food, yet sometimes present as here; then loss of appetite, a much more frequent phenomenon; then paleness, languor, weariness, and pain in the stomach; then anasarcous œdema, and, in short, the other more marked symptoms of anæmia.

You may observe that the loss in those constituents of the body which are of a nitrogenous chemical composition, is more marked than that in the hydro-carbonaceous fat. The reason is partly that the destruction of adipose vesicles is somewhat shrouded by the saturation of the tissue with serum, which gives it a false plumpness—partly that fat, being absorbable without much (if any) alteration, is easier taken up into the system than fibrin or albumen, which require a chemical solution before they can be absorbed. So that, though starved, Margaret looks but little emaciated.

All that I have now said must have of course for its moral some hints on the treatment. My aim in anæmia is to introduce as quickly as I can the largest possible amount of (1) nitrogenous food, (2) iron, (3) chlorine. When I say "introduce," I do not mean "throw in," or get swallowed, but cause to be assimilated in the system.

As regards the first, it is obvious that if I had written down ever so many "ordinary diets," one to whom the very sight of food was an abomination would have gained nothing by it; she would simply have gone without. I directed no meals at all to be taken, and no solid food; but a cup of milk with a third part of lime-water in it to be given as medicine every two hours, and a pint of beef-tea in divided doses during the day. After two days she managed to eat an egg also daily, and after twelve days of gradual additions of this sort, you will find her on full allowance of mutton chops, porter, beef-tea and milk.

Iron is required to supply the anticipated new growth of red discs with their metallic constituent. You cannot force into the system in any way so certainly as by the "mistura ferri composita" of the pharmacopœia. Large doses of the more soluble salts of iron have an action on the mucous membranes which not only prevents their being taken up, but only checks the digestion of other food. Evidence of the last-named effect is

found in loss of appetite and feverishness, and in the rejection of iron and undigested food among the blackened stools much sooner than when the drug is given in the form named. In spite of the elegance of preparations constantly put before us, and recommended for their solubility, such as the chloride, acetate, citrate, phosphate, and other salts of iron, I often prefer the unchemical mixture. It seems as if the carbonate which is preserved from decomposition by the sugar, and the finely divided oxides diffused through the thick liquid, were peculiarly easy of solution in the water saturated with salts and carbonic acid, the solvent with which we have to do, not only in the stomach, but throughout the whole body.*

I have found that some cases which did not get on so fast as I could wish under the above treatment, made a sudden start of improvement when to it there was added the administration of chlorine in the form of warm hydrochloric acid baths. More iron is taken up, the blackening of the fæces ceases, and it may be that the presence of more acid in the system retains more of the metal. In a few cases I tried for experiment's sake the hydrochloric acid baths alone; and even then it was beneficial, seeming to confer muscular strength in the same way as the drugs which are commonly called tonic. On these grounds I cannot but think that hydrochloric acid supplies a distinct want in the system, that it is a directly restorative medicine in anæmia.

It is not difficult to make this empirical observation accord with rational pathology. In anæmia the blood is more watery than natural; the proportion not only of organic matters but of salts is deficient. Chloride of sodium is the most important of these salts, and the supply of one of the constituents of this material may be without fancifulness conjectured to be an aid to that renewal of life, which is the end of all medication.

Besides the above-named medicines, you see that I have prescribed *Pil. aloës cum myrrhâ gr.* iv *omni nocte sumenda.* Do not suppose that this is ordered merely as a purgative, or that

* In reckoning the solubility of medicines, physiological pharmaceutists are apt to count the fluids of the body as distilled water, and because a substance is not soluble in that medium, to call it insoluble altogether; whereas, if it be soluble in water saturated with carbonic acid and salts, it is sufficiently soluble for the purposes of life.

any other purgative would do as well. On the contrary, most purgatives are injurious in anæmia. Gamboge, sulphate of magnesia, colocynth, mercury, and several others which produce elimination of serum and increase secretion generally, do harm just in proportion to their activity. It seems established, by the experiment of making them act as purgatives when injected into the circulation, that their soluble principles have a destructive agency upon the blood; whereas the soluble alkaloid in aloes (aloine) is, in fact, a bitter tonic, and the purgative power of the drug resides in its insoluble resin.* Its action is very moderately eliminative—in small doses it slightly adds to the solid excreta of the colonic glands, and elicits fæces feculent in smell and of consistent form—whilst at the same time it retains by its bracing bitter the formation of mucus. See its action on moist piles, how it dries them up and makes them smart! And judge from this what its action on the gastro-intestinal mucous membrane is likely to be. At the same time, by the more vigorous peristaltic action and by the solid mass passed along the gut, the already existing mucus is cleared away. Aloes is employed strictly as a clearer of the intestinal, especially of the colonic, membrane, and it is joined with myrrh, partly to divide it minutely and make a small dose go further, and partly to get the advantage of the extra resin.

(Part II.—*Clinical, St. Mary's, January* 23*rd*, 1863.)

In a young unmarried woman, who leaves the hospital to-day, you may see an example of an occasional effect of anæmia to which I have not hitherto called your attention, I mean its effect on the mental faculties.

Margaret H., aged nineteen, a stout and well made, but small boned, girl from the city of Cork, was admitted at Christmas with pallor, palpitation of heart, œdema of ankles, loss of appetite, amenorrhœa, and some other of the usual symptoms of anæmia without organic disease. She was not at all hysterical. She stated that she had been eight months in London engaged

* Headland on the 'Action of Medicines,' p. 331; and Robiquet, in the 'Journal de Pharmacie' for April 1856, quoted by Dr. Headland.

as a maid-of-all-work, and attributed her present illness to the hard labour entailed by that situation. She was ordered food every two hours and Griffiths' steel mixture thrice daily, and has been taking the latter up to the present time with the usual improvement to her health. So far she exactly resembles a class of cases, of which we admit two or three every week.

The only peculiarity was her excessive sluggishness of body and mind. She would lie or sit for hours without moving in the posture she was placed in; and if desired to walk dragged herself along like a sloth. If questioned she sometimes did not answer, or confined her reply to rigid monosyllables. This slowness of nervous and intellectual power remained even after she had begun to regain colour in her lips and cheeks; so that the sister and nurses set her down as naturally half-witted, and doubted the possibility of her gaining her livelihood as a servant even in the humblest capacity. As she possesses more than ordinary personal attractions, I dreaded sending out such a simple-minded creature defenceless into the wicked world of London. But during the last week some accident has set her to work at crochet, and I found her fingers nimbly twinkling at this occupation, which it seems she had been accustomed to in Ireland. She was encouraged to proceed, and to our surprise the manual operation, monotonous and mechanical as it seems to us, acted like magic; in a few days she became cheerful, laughs and talks to the patients, and has turned out a brisk girl of more than average intelligence. In consequence one of our hospital visitors has proposed to get her a place as lady's maid.

Doubtless the way was prepared, by the action of the iron in curing the anæmia, for a very slight extra restorative agent to enable her to regain her mental powers. Still I cannot but attribute very considerable influence to the habitual occupation, associated as it is with memories of her former happier life, taking her thoughts away from the dark noisy back kitchen of a small London shop to the old merry days in county Cork.

There were here two deficiencies to be restored;—first, that of red globules in the blood, which was effected by food and iron in the manner I have so often explained to you;—and secondly, that of the mental faculties; some new and brighter associations were required to excite her voluntary nervous

system to action and to break the dull chain of her daily routine. Accident supplied this in the present patient's case, and with such good effect, and so strikingly, that I trust you may be led to make your reason in other cases take example, and do intentionally what was here done by a lucky chance. Occupation, and that not merely of an amusing character, but of sufficient interest and importance to require constant attention, is often a most valuable aid to treatment. I have known the little household duties which are a woman's function, even needle-work which must be done by a certain time, such as making a pair of slippers for their doctor, have a most beneficial effect upon the weakened mind.

(Part III.—*Clinical, St. Mary's, February 6th*, 1864.)

The cases entered as anæmia in the register are usually such as do not display signs of any organic lesion to account for the deficient supply of red blood to the tissues. And the knowledge that these patients are readily cured by iron is so familiar to you that it seems almost like a truism. I am not sure if you equally entertain the fact that the same treatment is not less applicable to those whose defect is explained, either mechanically or physiologically, by some discovered structural change of a permanent nature. You are too apt to look upon this structural change as the main point to be considered, and in consequence, where it happens to be irremovable, you do not pay sufficient attention to such results of it as are really quite susceptible of care.

To illustrate my words I will call to your recollection a young woman who has just left the hospital. On January 8th Louisa O., an unmarried servant, aged twenty-five, was obliged to be sent up to bed with anæmia of very marked character. There was not a trace of red in her cheeks or lips even under the influence of excitement. She was hardly able to stand upright, and the attempt to do so brought on great faintness and giddiness. The catamenia which last flowed, though at the regular time, were of a greenish colour. She had palpitation of the heart, and had been getting paler for several weeks, but the inability to stand was only of a fortnight's duration. There was

pain complained of in the cardiac region, and a loud blowing murmur was to be heard with the first sound. This blowing murmur was very audible all over the cardiac region and up the large vessels into the neck, but loudest and of a harsher character than elsewhere just at the level of the aortic valves. She could give no history of rheumatism, but had scarlatina some years ago. She was treated with iron mixture every three hours, and beef-tea and milk every two hours. On the 13th she was able to eat a mutton chop. On the 16th the lips were getting rosy, and she was able to colour up when spoken to. By the 27th she had gained a very fair colour, even when not blushing, and she was discharged on the 29th. But the cardiac murmur remained as loud, if not louder, and was equally ringing in its tone at the level of the aortic valves. She went home registered as "cured" (for it had been indexed as a case of "anæmia"), was supplied with a large bottle of her mixture, and was advised every two or three months to take a ten days' course of iron in some form. She was warned also that mercury, purgatives, antimony and all debilitating medicines were very bad for her constitution.

I have no doubt in my own mind that this patient's central organ of circulation is in an imperfect condition; and the special auscultatory signs induce me to think that the imperfect condition consists of a narrowness of the aortic orifice. It is true that she has never had any of the illnesses which usually cause cardiac lesion, and therefore I do not suppose the lesion to be of a degenerative kind. I should conjecture it to have more of the nature of an arrest of development. She is a puny, incompletely grown person, of slim figure, with narrow hips and hardly any bust, with fine soft hair and a delicate skin. Though turned twenty-five, she has rather the aspect of seventeen. I think it very likely that the aorta and its valves have not grown with her growth, but still retain the calibre suitable for a girl. She is consequently unable to do woman's work; and even the usual monthly discharge from the uterus, which is a relief to the fully formed female body, is too much for her. For the supply of blood to support such work is limited by the limitation of area through which it has to pass.

Whether the aorta will ever make up for lost time, and,

though late, accommodate itself to the body, I cannot tell. But I can tell by the results of this and similar cases that the watery blood is capable of renewal, though it be watery in consequence of a still existing cause. And if any agent ever removes that still existing cause, by renewing its imperfect life, I am sure that agent will be healthy human blood, the best medicine ever devised.

The warning I gave her was directed against an unfortunate tendency, common to both the public and our profession, towards commencing treatment habitually with destructive remedies. They call this "clearing the decks for action;" in a majority of instances they throw overboard much of the best tackling in the ship and loosen her armour-plates. A so-called "sluggishness of the liver" is a frequent pretext. In a half-nourished person with pale blood of course the fæces are light-coloured and ought to be scanty. Blue pill gives them immediately a darker colour and increases their quantity, but sadly at the cost of the patient's strength; while the temporary change soon passes off. Meat and iron produce the same result, by giving them more to be made out of, and the improvement is a real and permanent one.

LECTURE XXVIII.

PROMINENCE OF EYEBALLS.

Cases with commentaries—The pathology of the disease associated with that of anæmia, and the requisite treatment thence deduced.

(*Clinical, St. Mary's, May 2nd,* 1863.)

A YOUNG woman who left the hospital yesterday exhibits one of the occasional accompaniments of anæmia in a marked degree. She is a subject of that state of the eyes called (somewhat barbarously) Exophthalmia or Exophthalmos.

Emily M., aged twenty-three, spinster, had been in since April the 10th. She is a leucophlegmatic flaxen-haired girl, but tall and well-grown, "with great marble limbs." Her complaint was menorrhagia, which had began a month before by a slight attack of hæmoptysis. Of this she was soon relieved by an ounce of infusion of digitalis three times a day, a grain of opium every night, and complete rest in bed; and I am not going to lecture on that subject now. She has had two attacks of rheumatic fever, the first when a child, the last two years ago. Four years ago she had measles rather severely, and since that date her eyes have gradually got very prominent. The prominence varies somewhat with her state of health, and on her admission was worse than usual. The left eye squinted disagreeably outwards, as is usually the case when she is in her worst state of health. On gently applying firm pressure with the fingers to the eyeballs, they may be got back to their natural place in the sockets, and at the same time the cellular tissue beneath the lower eyelid swells out.

There is slight dulness on percussion, accompanied by bron-

chial breathing, below the right clavicle. There is a loud systolic murmur in the heart, much most marked at the level of the aortic valves, and not affected by change of posture.

This prominence of the eyeballs is a pathological problem not yet at all satisfactorily solved. There are four ways in which it has been accounted for—first, by describing it as an enlargement of the eyeball itself, a view advocated by Drs. Begbie and Stokes;—second, by its protrusion in consequence of hypertrophy of the tissues at the back of the orbit, as is maintained by Basedow;—third, by a congestion and dropsical swelling of the same tissues, accompanied by want of tone in the ocular muscles, to which Mr. Cooper ascribes it;—fourth, by an increase of the fat which forms the padding of the globe, which Dr. Heusinger has found in two post-mortem examinations. These different views are described and enlarged upon in the 'Edinburgh Medical and Surgical Journal' for 1854, page 426, where you will find full references to the literature of the subject.

The first explanation certainly can apply only to exceptional cases. In those at present under my care no enlargement of the prominent organ can be detected; nor in two patients I saw cursorily several years ago, do I remember to have observed it. Indeed, in the girl whose history I have just related, the globes are both rather small for one of her height and size. I can hardly imagine a tough, leathery sac, like the eyeball, swelling without a local disease of its coats, such as cancerous degeneration for example; and that would produce a disease of quite another class, and not to be confounded with the subject of this lecture. "Hypertrophy" of the tissues at the base of the orbit, suggested by Basedow, would imply a persistent and irremediable condition; whereas I am sure that the eyes are at some times more prominent than at others, and that considerable improvement may take place.

My own impression is that the slighter and incipient cases may be quite accounted for by relaxation of the muscles, and that would soon be increased by a consequent filling up of the tissue by fluid and congested vessels. I incline therefore to the opinion given by Messrs. Cooper and Dalrymple, who attribute the disease to this cause.

At the same time it must be observed that Dr. Heusinger supports his opinion as to its dependence on an increase of fat in the post-ocular space by two post-mortem examinations, in which he found that condition of things. And I do not see any inconsistency in supposing that while the lighter cases are explicable in the way I have first advocated, the fatal and more protracted should exhibit a more permanent morbid change. The deposit of fat in the tissue is quite analogous to what takes place in parts which have been stretched or temporarily enlarged, such as in the mammæ or abdominal parietes after frequent pregnancies, in old hernial sacs, in the scrotum after long-continued varicosity of the veins, in the ear and lips after they have been unnaturally stretched in accordance with savage ideas of ornament.

I mentioned having two other cases now under my care. As it is rather a rare disease, I shall take the liberty of breaking my usual law for clinical lectures and of relating their histories, though I cannot enable you to verify them for yourselves. Mary B., a surgeon's daughter now aged thirty, first came to me in June last year. She had been for several years the unremitting nurse of an invalid mother, and restricted from the enjoyments almost essential to the health of her age and sex. For three years the catamenia had been irregular, and sometimes absent for several months at a time. Her face and lips were pale, and her skin fair and delicate, easily flushing with excitement. Six months previously she had a severe pain in the region of the heart, and her doctor told her it was "rheumatism of the heart," and she had also suffered from palpitations. About that time she began to perceive a prominence of the eyeballs, and this had gradually become so marked as to make her uncomfortable by the observations it excited among her acquaintance.

Examination of the chest showed the lungs to be quite healthy. The action of the heart was sharp, and there was a short harsh scrape audible towards the end of the first sound at the level of the aortic valves.

I ordered her to take an ounce of the following mixture twice a day :—

℞ *Tincturæ ferri sesquichloridi* ʒij,
Strychniæ hydrochloratis gr.½,
Tincturæ digitalis ʒj,
Misturæ camphoræ ℥x,
Fiat mistura, cujus sumantur cochlearia ij maxima bis die.

I kept her in London a few weeks as a rest, and since then she has taken every two months a three weeks' course of the medicine. She sends me word that now with the improvement of her general health the eyes have become much less prominent, and that she is by no means remarkable in her appearance.

The other case is that of a puny woman of about fifty, who says she has been always ailing all her life, but never quite ill. She is the subject of a gôitre of the central part and right lateral lobe of the thyroid gland. There is also a good deal of palpitation of the heart, but I cannot satisfy myself of the existence of any decided murmur. She is a very timid nervous person, and has some sort of fits, probably of an hysterical nature. I gave her iodide of potassium, and applied iodine externally to the tumour of the throat. But after three weeks it was but little, if at all, reduced, and she felt sure that her general health was the worse for the treatment. So then I gave her iron in full doses, and she seemed stronger again. She was at this conjuncture much thrown back by the alarm occasioned by a fire in her house. Her eyes are no better, but she is an unsatisfactory patient, and I question whether she perseveres in her medicine.

Another case came under my care in the hospital during the first week of 1859 :*

Charlotte B., aged thirty-nine, a dressmaker, had been in poor health for more than three years, and had always been a weakly creature, of pale leucophlegmatic aspect. At the period named a swelling about as big as an egg came in the front of the throat. It was hard and had increased in size gradually to that of nearly three eggs at the time of admission. Latterly there had been strong pulsation in it, and it had caused occasional dyspnœa, for which leeches had been applied a week previously, with temporary relief. She was hysterical and had a nervous cough of a spasmodic, noisy character. Both eyes were ex-

* See Case Book XIX, p. 95.

cessively prominent, and this prominence she said had first been observed a year before, and had increased up to admission.

I cannot tell you much more about this case, as I was just then obliged to go abroad, but she is shown by the register to have left the hospital at Lady-day, and has not been again admitted. She has attended from time to time, however, as an out-patient, and finds the occasional course of steel she gets beneficial, or she would not come for more. I have seen her about in the neighbourhood, and her eyes seem no worse.

All these cases, and indeed all the cases recorded by various authors, so ably collected by Dr. Begbie,* however much they may differ in minor details, agree in connecting the disease with anæmia, and especially with those tendencies in anæmia to disorder the heart and the growth of the thyroid gland. Experience seems to refer the gôitre, the weakened heart, and the protrusion of the eyeballs, to the same motive causes. They may not be connected with one another, but they are all connected with anæmia.

Although, therefore, the direct mechanism by which the eyeball is pushed outwards may be obscure, it seems to me that we know enough about the ailment to be quite satisfied as to the right treatment, the most important point for both the patient and ourselves. Courses of steel and restorative diet, rest of body and ease of mind are the most effectual means of recovery, and seem to have been adopted by all those who have mentioned their treatment in the histories they put on record.

In addition to this I should direct the patient to gently press back the eyeballs, and to wear a bandage over them at night.

We know enough about the ailment also not to be alarmed at it, and to assure our clients that it is not of a nature in itself fatal to either life or sight.

(*Clinical, St. Mary's, May 30th,* 1863.)

Elizabeth M., aged sixteen, about whom I have been lecturing as having pneumonia and typh-fever, is worth observation also on account of the singular expression given to her face by eye-prominence. It seems she has always been a delicate child, and

* 'Contributions to Practical Medicine,' 1862.

she has had several acute illnesses of which the last was rheumatic fever, accompanied by pain in the heart, two years ago. There are clear signs of regurgitation through the mitral valve now heard by auscultation, but no other evidence of cardiac disease. She is now flushed with the fever and pneumonia, but is generally pale, and is thin and weak looking. Though she is of full age, yet her mother says she has not yet been monthly, and her bust is quite child-like.

This unnaturally protracted childhood is a frequent accompaniment of valvular disease of the heart; so common is the association, that it has not rarely been the very phenomenon which has drawn my attention to the heart; and led to my finding out cardiac lesions before unguessed at. It continues often till after twenty years of age. I take the explanation of the facts to be, that from obstruction or regurgitation in the central organ blood enough is not spread over the body to carry out the functional development fitted to the time of life. Here you see a striking instance of it.

In marked contrast to the undeveloped mammæ is the throat of this girl. It has the full round form, swelling out in the middle and sides, characteristic of plump and perfect womanhood. On examination by the hand this is found due to a soft enlargement of the thyroid gland—an enlargement which I told you in my last lecture on this point is very commonly associated with the eye-prominence of which our patient is the subject.

Like the last instance we had of this disfigurement it is stated to be worst when the patient is ill, and indeed it has become more remarkable since she has been in the hospital; as has also the gôitrous swelling, which at first was scarcely perceptible. I mentioned to you before the same thing as occurring in the case of a surgeon's daughter, whose eye-prominence is aggravated by severe dancing, long walks, and the like. Couple with this the fact that it entirely disappears after death, the eyes receding completely into their sockets, and I think you have evidence enough that however long and obstinate it is still a temporary curable disease; and moreover, what is of more consequence, evidence enough to lead you to the means of cure, namely, those remedies which cure anæmia. This swelling of the thyroid is of a sort which will be more benefited by iron than by iodine.

LECTURE XXIX.

ATROPHY OF MUSCLES.

PART I.—*Cases—Pathology—Treatment—Questions respecting hypertrophy.*

PART II.—*Case of dropped hand from the poison of lead—Pathology of this form of paralysis and its connection with colic—Reasons for not considering its localization as dependent on the immediate absorption of lead—Treatment with iodide of potassium, sulphur baths, splints, electricity, quinine, oil, and blisters—which beneficial, which hurtful.*

PART I.—(*Clinical, St. Mary's, June 13th,* 1863.)

NATHANIEL B. is a thin ascetic-looking man, of a faded-leaf complexion, aged forty-five. His expression recalls some stern "Bind-their-kings-in-chains" of the Great Rebellion, or those faces one sees in old Spanish monasteries, not in the flesh, but looking out of the grim canvas of a Zurbaran or a Ribrera. Nathaniel B. is a top-sawyer by trade, and was always a hearty fellow, able to do a good day's work, till ten months ago; when, after violent exertion in turning over a mass of timber, he got what he calls "a wrench" in the pit of the stomach, and "has never been the same man since." The appetite failed and therewith the strength; the muscles wasted, and the whole body grew emaciated. The loss of appetite then became entire, and then increased to an utter loathing of food. He went into Guy's Hospital three months ago, but left apparently dissatisfied and ungrateful. On gaining admission to St. Mary's, May 22nd, he seemed much cast down, expecting never to get any better. He was

able to walk about, and the chief loss of power seemed in the shoulder muscles, the deltoid and biceps; and when he tries to "put up" the latter, that is to throw into it the contractile nervous force, it feels quite soft, without any of the corky elasticity which distinguishes a sawyer's arm. He is the father of thirteen children, but since the commencement of his present illness, he has entirely lost virile power. He states himself to be a perfectly sober moderate man, and has a good character on that score from his employer.

It is scarcely necessary to say that the epigastrium and hepatic region were carefully examined for evidences of cancerous degeneration, and none was found. The lungs also were well auscultated, and nothing abnormal was detected, beyond a suspicion of slight comparative dulness in the right apex. He had not suffered from habitual cough or had any diarrhœa.

He was at first kept in bed and given milk and beef-tea every two hours, with ten grains of Boudault's pepsine powders three times daily. In a few days his excessive nausea and lowness of spirits had abated, and he was ordered six grains of quinine and three drachms of cod-liver oil daily in addition. In a few days more he was tried with half a mutton chop, digested it well, and on the sixth of June was able to take our whole ordinary diet, a pint of milk, and a pint of beef-tea, and a pint of porter. On the 12th (yesterday) he was so much better, that I thought it was scarcely justifiable to let him occupy a place in the hospital any longer, and I trust he will be able to get on as an out-patient.

As he was confined to his bed at first, it was not convenient to put him in the scales, but on May the 24th we found his weight 8 stone 5½ pounds; on the 30th, 8 stone 7½ pounds; on June 6th, 8 stone 10 pounds; on June 12th, 8 stone 10½ pounds; his height being 5 feet 6 inches.

The only day on which he did not take the pepsine was May 29th, when the stock was accidentally exhausted. He then complained of pain at the epigastrium and attributed that to the omission of the pepsine.

This is a specimen of disease not quite so common as those I usually make the subject of my clinical lectures, and on that score not quite so interesting or important. Nevertheless it has this importance, that if you do not understand its true

nature, you will be very apt to treat badly the patients afflicted, and to make them worse.

I have often told you that neglect of the powers our Creator has dowered us with is punished by their withdrawal: the intellectual sluggard becomes year by year more and more wanting in memory and judgement; the arm of the Hindoo fakeer, tied upwards for a few months, withers away; and the calf of the Chinese belle or of the stiff-booted clodhopper is flabby and wasted. It is very important that you should know that the same penalty which is thus inflicted on willful underwork, is also exacted from overwork, voluntary or involuntary. If a muscle is used so as to be worn out to a degree beyond that which the supply of nutriment is able to repair, or if it is so continuously used that there is no time for repair, it becomes degenerated, just in the same way as if it had not been used at all.*

You saw in the Cambridge ward two months ago a blacksmith's apprentice, of slight frame and with an imperfect aortic valve, whose arms, especially the right, had become atrophied from wielding too heavy a hammer. A few years ago I had in the same ward a patient whose chief employment was turning over large rolls of lead; and the extensors of his right forearm had become paralysed. About the same time a hard-drinking and hard-smoking, but hard-working, cobbler was under my care, who was unable to raise the arms from atrophy of the triceps and deltoids, muscles absolutely needed in giving the artistic jerk to the thread which these workmen affect. But his legs, which he had rested, were strong enough.

The following cases, exhibiting the same agencies in action under different circumstances, are from my private note-book.

E. C., aged fifty, had always been used to the regular habits proper for a London lawyer's wife, and not being fond of needle-

* And I am not sure, though for obvious reasons I should shrink from saying it to a mixed class of medical students, but what incautious intellectual work produces analogous results. How many men do we meet burdened, like little David would have been in Saul's armour, with more knowledge than they can wield! Their minds seem day by day weakened by the stores they cannot use, so that they become less and less able to apply them. To how many of our profession does the increase of practice bring the diminished, rather than the increased results of experience, if they do not sternly and conscientiously reserve to themselves time for "the sessions of sweet silent thought."

work, had generally amused her leisure with reading. At that time her eyes somewhat failed, and she was advised not to read so much, especially in the evening. As an employment she set herself the task of netting, first some strong nets, and then a set of drawing-room curtains. She worked several hours a day, fastening the work to her foot *secundum artem*, and drawing the thread upwards. After a time she felt a weakness in the right shoulder, then a pain and stiffness; being a very determined kind of person, she tried to work it off, rubbed and dowsed and shampooed her arm; but the more she did so, the worse it got, and she was alarmed at last by the joint becoming exquisitely painful to the touch. Then her arm was put in a sling and tied up, she took steel and wine and nutritious diet and quite recovered.

M., aged fifty-four, has lived an active literary life, writing much and well. Her vigor of constitution is shown by the menses only lately beginning to grow scanty and irregular. But she has a theory of corporeal discipline not reconcilable with rational physiology; she has thought to compensate for the exhaustion of mental labour by violent bodily exertion, and has been in the habit of occupying her leisure by furiously digging her garden with a masculine spade, and mowing her lawns, not with one of the elegant new machines, but an old-fashioned scythe. The consequence is that her good right hand has lost its cunning, and a letter she sent to seek my advice was scrawled with the left. The principal atrophy is in the deltoid and biceps muscles (those used in mowing), which are painful when moved, but not when pressed. She cannot raise her arm by independent efforts above the level of her waist, and it "feels out of joint if she tries to force it." Friction, brandy and salt, mustard, &c., have only made her worse. Her arm is now by my advice tied up, and she is taking quinine and steel and cod-liver oil in small doses.

You may easily recognise in all these cases the same evil in action under corresponding circumstances—atrophy produced by local overwork of voluntary muscle. And if you think, and examine closely the relations of the muscle to the rest of the organism, you will see that this overworked tissue is in a position not very different from the underworked tissue, whose

degeneration is so generally made the subject of remark by physiologists. The defect is in both instances a want of renewal. In underwork no demand is made for renewal, and in overwork the demand is made, but is not efficiently supplied. In the one the nerve-force, which should guide and govern the metamorphosis, is let lie asleep, and in the other has been so used up by unwonted toil, that it is exhausted, and for a time does not exist. So that the last effect on the muscular fibre is the same. No new store of muscular substance is laid in, and the old degenerates into inelastic fibre, and finally into a pale fatty tissue of still lower vitality.

What is called "over-training" in the prize ring has a similar pathology. The power of nerve over muscular fibre is capable of increase by education, so that it continues to brace it up more and more and to make the muscles harder and harder daily, till the "*gladiatoria totius corporis firmitas*" is attained, probably in as great perfection in our days as in Cicero's. But the muscular fibres themselves are not capable of proportionate augmentation, and when the nerves have learned to exercise them up to their full force, are incapable of further improvement. If then the training is continued, the nerve-force expends itself in exciting the continuous functioning of the muscles, destructive assimilation exceeds the constructive; the body "eats into itself for lack of something else to hew and hack," and loses weight beyond the mere loss of fat.* Nerve-force is capable, as far as we know, of indefinite improvement; but the instrument it plays upon cannot be made stronger than it was originally intended to be, and when it is overstrained it degenerates. Hence premature decay is not rare among pugilists, boat-racers, runners, &c., whose ambition is greater than their powers, and those who live by extraordinary exertions of physical strength have a short average of life.

The pathology is the same of that impotence of the generative and muscular functions which sometimes follows an active life

* A moderate allowance of alcohol during training, by acting as an anæsthetic to the nervous system, tends to prevent this result. Modern trainers are apt to enforce too great abstinence, with immediate selfish advantage probably, but to the final injury of their pupils.

in a tropical climate, and which cuts short the useful career of many of our countrymen in the East, and which is often unjustly attributed to lechery and drunkenness.

But the most common examples of the disease are where it occurs in one set of muscles from special and partial over use, such as we see in turners, carvers of ivory and hard woods, and similar handicraftsmen.

Muscles affected with atrophy are in an unnaturally soft and friable condition ; they are pale coloured, and look as if they had been macerated in warm water. They become like the muscles of a very aged person, and in fact the change is not much different from a premature local old age.

The change is usually first discovered by the patient in a much more sudden manner than you would have expected from its pathology. The "wrench" which our sawyer felt in his waist was not the real beginning of his ailment, but the last straw which broke the horse's back. And often painters will tell you that they went on earning full wages till a certain day, when they became utterly unable to raise their hand.

Pain is a variable symptom. Where one or a few muscles only are affected, it is a pretty constant accompaniment, and is usually set down as rheumatism, or as stiffness, the result of cold. In our present patient, where many muscles were more or less acted upon, it was absent, or so generally diffused as to produce rather a feeling of mental depression and malaise than of local distress.

Muscular atrophy and local paralysis will sometimes follow chronic poisoning by malaria. I have a strong impression that those are right who locate in the nerves the chief injury inflicted by such agencies as cause ague and its allied disorders of intermittent type. I am not therefore surprised at finding loss of nervous function, either in the form of neuralgia or paralysis, which can be attributed only to the poison above named. The only thing which distinguishes the paralysis from the other forms of aguish disorder, and consequently obscures the diagnosis, is that it is not intermittent.

The treatment follows as a matter of course from the pathology. It consists, in the first place, in enforcing complete rest on the diseased parts, in not allowing them to have even the labour of

supporting the members they belong to. The dropped hand we fasten on a splint; the paralysed humerus we put in a sling, taking care that the elbow is well supported and does not drag upon the shoulder; this patient, who is the text of my lecture, we put to bed and kept him there a few days. Then we administered animal food in a form by which the patient takes as much as the stomach can possibly digest. In this instance there was utter anorexia; so beef-tea and milk were swallowed in medicinal form every two hours. To aid in digesting it pepsine was ordered three times a day. To supply a basis for molecular growth, cod-liver oil was given, as soon as the nausea was beginning to abate. And quinine was added to brace the mucous membrane up to its duty of absorption. I have not prescribed iron, but it would be quite rational to do so now that the intestines have begun to recover tone.

Where the pains are severe, cold douche baths and cold water compresses give more relief than anything else. Warmth and stimulating embrocations seem to do harm.

Where malaria has been to blame, you must be careful in desiring your patients to avoid the dew-times—"when the mists arise that have strength to kill." A Roman proverb warns the native against the hour before and the hour after both sun-set and sun-rise, and many a stranger has suffered in that climate from a neglect of popular experience. In England the healthy population is not debarred from the sweet influences of these romantic hours, but those who have once suffered from malaria must remember that they are more than ordinarily liable to a fresh reception of the poison.

You may be tempted to inquire, if over-use of voluntary muscle causes atrophy, and under-use also, whilst moderate use leaves our frames well-proportioned, what sort of use it is which induces hypertrophy. I confess that in spite of the *decies repetita* statements of physiologists, who have been copying one another from the time of Galen, I do not know that any kind of use at all does so, in the sense of making the substance of the muscle larger when measured in a state of rest. Doubtless an actively employed biceps or gastrocnemius will more readily be acted upon by the voluntary nerves, will contract more strongly, and be harder and more prominent when contracted; but I

cannot find that it grows at all bigger. I do not absolutely deny the existence of the physiological hypertrophy of muscle; I only say that at all events it is very rare, for I cannot find any instance of it.

The most notable example of muscular hypertrophy ought to be an active, well-made, one-legged or lame man; seeing he uses one leg instead of two, it ought surely to be enlarged. Yet in measuring in several instances the remaining leg in a state of rest, I cannot find that the proportion which it bears to the arm is at all different from the proportion in ordinary persons of the same build. And I cannot find that as a rule blacksmith's arms are out of proportion to their legs. Both are muscular; for none but a muscular man can work at such a trade, and when excited, the brachial muscles contract firmer than those of the lower extremity, and are more marked; but they are not disproportionately large when relaxed.

Of course you will find employed in occupations where excellence may be attained by the special exercise of one set of muscles, men who have those parts well developed; but they are so developed originally, and not by the trade. Big-armed men become pugilists, big-legged men acrobats; but they do not become big-armed or big-legged because they are pugilists and acrobats.

Sometimes the development is strangely out of accord with the occupation; the wrong man gets into the wrong place. I give you the measurements of the upper extremities of Cordonnier, an horticulturist at Lisle, who has a most extraordinary development of the muscular and bony structure. He is not fat, but hard and firm, weighing in his clothes but sixteen stone, yet the circumference

of the	neck	. .	is	18 inches
,,	breast	. .	,,	44½ ,,
,,	forearm	. .	,,	13 ,,
,,	wrist	. .	,,	8½ ,,
,,	palm of hand		,,	11¼ ,,

How were these Herculean thews bred? In strangling dragons, stunning wild bulls, cleansing Augean stables? Did their owner—

"Tear the lion as the lion tears the kid,
Run on embattled armies clad in iron,
And weaponless himself
Make arms ridiculous?"

No—they are employed in tying-up ladies' bouquets, for his skill in which accomplishment Cordonnier is famed. I have never heard of an hypertrophy like that being due to over-use. Where the hypertrophy exists in voluntary muscles, I suspect it is due to a congenital peculiarity, and not to occupation.

PART II.—(*Clinical, St. Mary's, October* 31*st,* 1863.)

In Benjamin Franklin you have an example of a disease you will very often have to treat, if your practice lies among artisans, the "dropped hand" of painters and glaziers. He has been employed in the carriage building department of the Great Western Railway, and is an old looking man, though only forty-five. He has been a spirit drinker, but never gets actually drunk. He has had gout off and on for the last ten winters, and used to take a great deal of colchicum. He found however that drug to produce symptoms resembling those of delirium tremens, and has given up the use of it in favour of iodide of potassium, which agrees with him well.* On September 28th he gave us the following history. He had been first taken ill three weeks previously with crampy pains in the belly, which got worse in spite of castor-oil, till the 28th. About the same time his hands began to droop, and when we took him in hand, at that date, he could not raise them on the wrist at all. There were also severe pains in the calves and thighs. The gums had a livid line, characteristic of saturnine poisoning, to the breadth of an eighth of an inch round the teeth, and the description he gives of his employment shows that he is much exposed to the influence of white lead. Besides using white lead to form what is technically called the "body" of the colour laid on, he has also employed mercurial colours in the fine work required. And this addition of mer-

* His plan is this—when the gout comes on, he buys four pennyworth, or a drachm, of iodide of potassium, dissolves it in a pint of water, and takes it in the twenty-four hours.

curial to saturnine poisoning, or perhaps his bad habit of spirit-drinking caused a little peculiarity in the case, which was observed on his first admission: his arms were noticed to tremble when he held them out, as if afflicted with *paralysis agitans*. This peculiarity soon passed away, and there is nothing else to take the case out of the category of typical and ordinary instances of disease, such as I endeavour to select for my clinical illustrations.

I am disposed to explain a great part of the pathology of painter's dropped hand on the same principle which I stated to you on a former occasion apropos of simple muscular atrophy. The white lead is slowly absorbed by its gradual and sparing solution in the fluids of the body, which are rendered capable of dissolving it by their saturation with carbonic acid. In the blood it destroys the red globules, and carried to the muscles removes their red colour also, and renders them incapable of contracting except under extraordinary nervous influence. This paralysing effect is most commonly shown on the involuntary fibres of the intestines, producing the well-known painter's colic. There are two reasons why it should be exhibited soonest on these intestinal fibres; first, they are the nearest to the usual portal by which the poison enters, the path of the food; secondly, they are weak muscles, and yet have constant, almost unintermitting work to do, so that they can have but little repose during which recovery from exhaustion might be possible. Hence colic and constipation from arrested vitality in the intestines is the commonest result of lead poisoning.

To the muscles of voluntary motion in the trunk and limbs the same principles apply, and most especially the latter. Those muscles become most paralytic which are most exhausted by the peculiar employment of the individual. I had a patient a few years ago whose work lay in a sheet-lead warehouse, and consisted of moving very heavy masses of that weighty metal. He became gradually paralytic in the right forearm, and weak in the loins, parts extraordinarily exhausted by his labour. Painters, especially fine painters, such as those employed upon carriages, do not use the biceps, or the shoulder, or the dorsal muscles more than other people; but they do use excessively the extensors of the hand. Try for yourselves the drawing of fine

lines on a wall with the arm free, and you will find how painfully tired the outside of the forearm soon gets. Artists usually rest the wrist on a mahlstick, with the result of saving these muscles, and seldom get paralysis. But for some reason or another artisans generally adopt another plan of gaining the requisite fulcrum for steadying the line; they fix the hand by means of the fourth and little finger on the plain surface, calling the support thus obtained their "compass," and then wield the brush with the thumb and forefinger. This throws a terrible strain on the extensors of the wrist, and they suffer accordingly. The over exhausted fibres become atrophied, pale, and paralytic; while other muscles escape, although equally exposed to the baneful influence of the lead, but not so much used.

I am not certain whether the neighbourhood to the paint has much to do with the hand becoming paralytic. At first sight one would be disposed to think it had. But then on reflection you will observe that other muscles which are equally near, such as the flexors, do not become affected; and others which are still nearer also escape. A dropped hand can often twiddle its fingers with their interossei and lumbricales, bend in its thumb with its adductor pollicis, and even exhibit the delicate action of the palmaris brevis. Now, the fibres of these muscles have but a layer of skin and dirt between them and the paint during the whole of working hours, whereas the forearm is scarcely even directly exposed to it; for it is very unusual to see fine painters tuck up their shirt sleeves, and the majority even work in their fustian jackets; yet it is the forearm that becomes affected, and not the more directly exposed muscles.

This man was treated with iodide of potassium, to bring the lead remaining in him into a soluble form capable of being removed by the fluid excretions. He had also sulphur baths thrice a week to test the progress of this removal of the poison. For ten days the secretion of his skin in the delicate places (such as the axillæ) was stained blackish with each bath from the sulphuret of lead formed. But after ten days the stain was no longer visible; and at the same time the livid line round the gums began to vanish. He was losing his lead—the cause of the disease was being removed.

Yet though the cause was being removed, the disease re-

mained, and indeed still remains to a considerable extent. The treatment applied to it has been first—rest. The hands are placed on splints for the greater part of the day and night, so that their weight may not drag upon the muscles. Secondly—intermitted motion. Electric shocks are passed through the muscles for a short time daily. Thus the atrophy of over-exertion and the atrophy of disease are both guarded against by imitating the most healthy natural circumstances of rest and motion.

He is also taking quinine and cod-liver oil, to furnish a basis of molecular growth for renewed muscular fibre, and with this treatment he has decidedly improved in general health, and is able to raise the wrists much better.

But while I tell you what has benefited him, I should also tell you of one thing which in both his and my own opinion has done harm. As an experiment I treated the forearms for three days with small flying blisters, never allowing them actually to produce vesication, but to be moved onwards when the skin became reddened. The paralysis was certainly worse during this application, and for several days afterwards, so of course I shall not repeat it. What I have previously mentioned to you constitutes the ordinary and typical treatment of dropped hand, and, though I mention it as part of the established treatment in my systematic lectures, I have always felt doubtful in what sort of cases blistering is beneficial, if any.

LECTURE XXX.

CHOREA.

PART I.—*Case treated without drugs—This case a recent one—Principle of treatment.*

PART II.—*Four long continued but curable cases treated with arsenic—Quoted as specimens of the disease as usually seen—Effect of forcible control over the movements.*

PART III.—*Records of three fatal cases and two unaffected by treatment—Connection of chorea and rheumatism and disease of heart statistically deduced from the records of thirty-three cases under my care.*

PART I.—(*Clinical, St. Mary's, February 20th,* 1863.)

A LAD of nine, Henry G., was taken in on the 19th of last month for chorea. His parents stated that the attack had come on suddenly a week previously without any assignable cause and while he was sitting at dinner. It began by convulsive movements of the arms and facial muscles, and very soon the whole body became affected. As he lay in bed I think I never saw more violent and uncontrollable motions of the limbs and body. He was never still, but speaking to him or touching the bed excited convulsions in the same electric manner as in hydrophobia, and judging by his wailing they seemed to be very painful. He was unable to retain his fæces or his urine. He was stated to have been subject to worms, as is the case with half the children of our labouring classes; so I gave him once and again a stout jalap, aloës, and calomel purge to ascertain the fact; but no worms or mucus appeared, nor had there been any collection of old fæces in the colon. Beyond that he has had

no medicine, except on one occasion a little catechu to solidify the stools, which were passed involuntarily, and prevent them dirtying the sheets so much. Yet you have seen the chorea pass away entirely, so that on the 14th instant the case book records that he carried the inkstand steadily round the ward for us, handing it with one hand, and he has been making himself useful to the sister by serving out patients' dinners. I have kept him in the hospital till to-day, solely to see if any relapse would occur.

I said he had no medicine for the chorea, but I did not say he had no medical treatment. He was surrounded as he lay in bed with toys, and he was induced to make every effort to retain them in his hands. In two days he began to get quieter, but not much more advance was made, till his regaining some power over the sphincters enabled us to have him dressed and to set him to walk in measured step about the ward. Then we imperilled our crockery in a good cause by letting him carry it about and clean it, till he rapidly acquired the steadiness you saw him exhibit a week ago.

The object aimed at was to draw off his attention from his miserable state, to concentrate the psychical forces in the endeavour to acquire power over voluntary muscle, and thus to renew their lost control.

Chorea is obviously not a disease which must necessarily go on from bad to worse if unarrested by drugs. The long list of varied remedial agents employed, many of them repugnant to one another, is enough to make us suspect this. Dr. Reeves, in his statistics of eighty-four cases occurring in the Norwich hospital, states that the shortest duration of the disease under pharmaceutical treatment was two weeks; the longest eight months; and the common average, seven weeks.* I suspect, though I have no statistics to show it, that the common average of duration of recent cases where no drugs are taken, would be very similar.

The pathology, or explanation of the immediate internal cause of chorea, is quite unknown. Sydenham ascribes it to a "humour thrown upon the nerves." In three fatal cases I have seen the nervous system seemed perfectly healthy, in one there were

* 'Edinburgh Med. and Surgical Journal,' vol. viii, p. 314.

tubercles in the spinal cord. Dr. Cullen thought that the malady depended on "a state of mobility" of the system; that is to say, that the limbs move about too much because they are too movable. Dr. Marshall Hall attributed it to "reflex action;" but talking of "reflex action" is merely to class the phenomena of convulsions under a common name, for nobody has yet dissected out the "reflex" nerves.

You may observe that in chorea the principal muscle in any intended motion is pretty fairly obedient to the will; the lad, when he was bidden to put out his arm, put it out; but those muscles whose motions are normally associated with the principal one, did not act; he did not put it out straight, and twisted it in every direction but the correct one. Hence Darwin classes it among "diseases (defects) of association," that is to say, cases where the necessary connection between certain vital acts is overthrown.

The existing or external causes are sometimes easier to discover. You have cases where the patient is anæmic, is teething, has mucous intestines and disordered alvine secretions impeding digestion, skin eruptions, retarded catamenia, pregnancy, diseased bladder or uterus, perineal fistulæ, tubercles in spinal cord. (In these three latter cases I am recalling to my mind examples of fatal termination.) Many others again attribute the disease to fright. In such instances you find that the chorea obstinately remains as long as the existing cause does, and on its departure begins gradually to decline. Under such circumstances the plan of treatment is obvious enough; you must turn your efforts to the removal of the exciting cause, if it is removable, and then expect with confidence that the chorea will disappear in about a fortnight. If the exciting cause is irremovable, or if (as in the case of pregnancy) it is too valuable to be got rid of, I cannot find that specific drugs do any good to the chorea.

But in a very large number of cases you can discover no exciting cause. Perhaps it has passed away; perhaps even if you had watched the patient all along, you would not have discovered it on account of its secret nature. In such cases I have usually been in the habit of administering arsenic; but really I cannot say that any patients under arsenic have ever passed

from a severe state of chorea to one of complete voluntary control more quickly than this boy without arsenic.

You may say truly that chorea exhibits sometimes a tendency to become chronic in cases where the general health only has been attended to. But I do not think that proves anything against my idea of its nature being to get well of its own accord. I believe that in these protracted cases there is a continual renewal of the cause of the disease; that it is in fact kept up by injudicious management. One of the most common forms of injudicious management is the fixing of the patient's attention upon the deficiency of voluntary control. They are told, and wondering bystanders are told, often with exaggeration, how bad they are; the malady is painted in heightened colours; pitying friends offer unnecessary help; cruel companions ridicule their infirmities; till, like the subjects of electro-biology or mesmerism, they lose control more and more from being told that it is lost. You may see this mental cause of the aggravation of the disease most clearly shown if two or three choreic patients chance to be put together in the same ward. It is impossible to avoid it sometimes, but you will observe that they always make one another worse. If one is getting better, she will be immediately thrown back again by the introduction of a new companion similarly affected; and not rarely a patient previously free will catch it by the contagion of the eyes.

The influence for you to exercise is the very reverse of this; you must encourage the patients to make every exertion to direct the movements of the limbs and let them perceive as little as possible their deficiencies in this respect. Above all, let them avoid looking-glasses or the depressing sight of other unfortunates in the same condition. Poor persons are best treated as in-patients of an hospital, as the advantage of getting them away from their injudicious friends outweighs the risk of possibly coming in contact with other choreics. If the patients are not in a position of life to make this resource available, at all events get them away from home as soon as possible. Sent under the care of a judicious governess to the seaside, or anywhere else for an excuse, many children recover rapidly who at home would have gone on relapsing and relapsing again every week.

Slow walking in timed step is excellent practice for regaining

directing power, and I dare say slow music and solemn minuets would be equally efficacious; you may remember that the Tarantella was so called from being used to relieve a nervous affection falsely attributed to a poisonous spider;* carrying trays and crockery, and other things that demand care, assists the cure. In short, using the will contributes more than anything else to its renewal, and is the only real "specific" for chorea, when once the original exciting cause has been removed.

PART II.—(*Clinical, St. Mary's, May 30th*, 1863.)

Maria S., aged thirteen, was received May 1st with very severe chorea of six weeks' duration. No cause could be assigned by her mother, nor could any worms be found in the fæces, but from her dirty and neglected appearance and the unnatural smell and colour of the alvine excretion, I have no doubt she has been fed on diet very unsuitable to a growing girl. The muscular movements were so excessive as entirely to prevent her speaking intelligibly, but she was quite quiet when asleep. She is a thin but healthy looking child, and the only abnormal phenomenon is the fetidity of the stools. She was kept for six days without medicine to observe the case, and no improvement was found from the better food and discipline of the hospital. She was then put upon four minims thrice a day of liquor potassæ arsenitis, and immediately began to get better. On the 9th she could walk up and down the ward and feed herself, and is now able to assist in washing up the crockery, and will leave the hospital shortly.

Along with the last patient I also took in Richard B., aged nineteen, a chairmaker. Three months previously he had been obliged to walk home four miles in the dark, of which he had from childhood been much afraid. He was overwhelmed with fright, but concealed his fears out of shame. After this he

* In Kircher's specimens of Tarantella tunes the first are merry jigs, but the last is like a funeral march, and must have been composed, as one would guess, for some church dignitary affected with the curious contagious chorea of the fifteenth century. See Hecker's 'Epidemics of the Middle Ages.'—Dancing Mania, p. 172.

became very nervous, and chorea gradually came on. The chorea increased so much, that for six weeks he had been unable to work at his trade. He is very thin and pale with blue cornea to his eyes. He was put upon *misturæ ferri* ℥j *ter die*, to which has been added since ℥j of cod oil. And he has also now a shower-bath every morning. On the 9th he was steadier than on admission, but then the improvement became stationary, so that I resolved to treat him also with arsenic. The quantity has been gradually increased up to ♏xvi of the liquor potassæ arsenitis three times a day, and he has been slowly but steadily improving.

A third patient, Emma B., aged fifteen, has been under my care only eight days. The catamenia had occurred for the first time two months previously, and about the period when they ought to have been again present she was observed to get restless and fidgety. In a fortnight's time this restlessness became complete chorea, which was the prominent disease on admission. The movements were then almost entirely confined to the right side of the body. Two nights before admission she had an hysterical fit, but this had not before or since been observed. After she had been in hospital a few days we found that the chorea came on in paroxysms of about two hours' duration, during which it was very violent over the whole person. In the intervals she was comparatively quiet, and could speak easily, though not extend the right arm straight.

I ordered at first valerian, which seemed to do no good, and now she is taking arsenic like the others. She has also in addition a warm hip-bath nightly.

These are interesting cases for you to watch, for they present examples of the disease when it has already assumed a chronic form, and when the mere fact of its existence makes it reproduce itself, if I may so express myself. I mean that the constant movement and annoyance arising from the chorea still further weaken the already weakened and predisposed body, and so instead of tending to recovery naturally tend to a prolongation of the malady. In this stage it will not get well without some strong measures in the way of drugs. You saw that the child Maria S. got no better during the week that she was treated by diet and discipline alone. We must have recourse to the pharmacopœia.

One very powerful aid is iron, and a great many cases may be cured with that remedy, either in the form of the red rust or of Griffith's mixture. But you saw that iron was beneficial only during the first two or three days to the boy Richard B. And the disease may come on even whilst a patient is taking iron. It did so a few years ago in a boy in this hospital, for whom I had prescribed that mineral for tubercular consumption (No. in Register 8626, November 13th, 1857). Nevertheless he got well of it without any change in the treatment. Perhaps he caught it by imitation of some other patient in the ward, but the clerk has made no note of the fact. If so, both the supervention of the malady and its cure are easiest explained.

Valerian is sometimes useful in chorea which arises in girls about and soon after the time of puberty, when it is apt to assume a paroxysmal form. This paroxysmal form we observed in Emma B., but still the valerian did not cure her.

In all forms, however, you have seen a very decided improvement under the use of arsenic.

I should not have called upon you to notice this, had they been recent cases, or if they had been cases in which a turn towards recovery had already been taken. Under such circumstances you may easily deceive yourselves as to the action of medicines, which do not cause, but are merely given along with the cure. About arsenic, however, I do not think you can have any doubt, observing these and similar patients, that it really acts as a special tonic to the nervous system,—curing the chorea irrespectively of the cause whence it has originated. As arsenic is not a normal constituent of any part of the body, and cannot be imagined to replace any normal constituent; while at the same time patients increase in strength and weight during the course of taking it, I suppose it must be an indirect constructive, acting powerfully on the nervous system.

(*Clinical, St. Mary's, June* 13*th,* 1863.)

Of the three patients about whom I lectured a fortnight ago Maria S. has gone home well, Emma B. is at work washing up cups and saucers, and Richard B. has improved as to his arms

and legs, being able to walk straight and hold out an inkstand for me to write prescriptions from. But his organs of speech have not improved at all. He stammers, and chews, and gnashes his teeth most painfully, whenever he struggles to talk.

Impediments to articulation are usually the most difficult part of chorea to cure. Many who have had chorea only in childhood will stammer all their lives. So delicate are the muscular motions required for the rapid modifications of form which make the sounds of the different letters in speaking, and so decided and firm must they be for intelligible enunciation, that the slightest deficiency becomes immediately apparent. A muscular contraction which might be well enough directed to guide the fingers in writing, may be very incompetent to shape tongue and lips in pronouncing. A tremor not noticed in the former is disagreeably prominent in the latter.

The annoyance to the patient caused by this difficulty still further increases it, so that it reproduces itself and becomes chronic. More than that, the glottis is irregularly acted upon, and closed when it ought to be opened, so that speech, and sometimes the breath, is absolutely arrested. Nobody stammers in singing, when the glottis is kept open to form the musical tone.

Stuttering and stammering are in fact a local chorea. There is a deficiency of voluntary control over the muscles of speech.

In a recent case, such as this, very likely the arsenic will be of use, but I do not know whether it would be available where the defect has become habitual. The best way under that circumstance is for the person to humble himself to the infant state, and be taught to speak all over again. He can get instruction from those ingenious tutors who teach the deaf and dumb, and systematically learn to shape slowly and deliberately his mouth into the form requisite for enunciating each letter separately. By practising this at his leisure and before a looking-glass he may gain great control over the articulating muscles.

I shall in this case continue the arsenic, and not recede from the large dose (*m xvi of the liquor potassæ arsenitis*) unless there is perceived some poisonous action, such as sore throat, inflammation of the eyes, severe griping. I have also directed him to practise the reciting before a mirror sundry choice scraps

of literature relating to Peter Piper and his practices, which are popular practice in p's.

[This boy improved slowly, the arsenic having been increased up to ℥xviii of the Fowler's solution three times a day. He went out cured and able to go to work on July 3rd.]

I have began arsenic with another patient taken in yesterday, June 12th, Ann W., whose case presents some analogy to the present condition of this boy, in that the chorea is confined almost entirely to one part.

The said Ann W., a fine tall girl of thirteen only, though she looks older, has been subject to occasional chorea since she was five years of age. Latterly she has had an attack annually, and last year two attacks. The chorea is almost always confined, as now, to one arm; with one exception to the left arm. But once she had it in the right arm only, and last year in the left leg and left arm only. The catamenia have not yet been established. There is no abnormal murmur in the heart, and she has never been subject to rheumatism in any form. I have ordered her arsenic and shower baths.

It will be interesting to watch this case and see whether the very local chorea is benefited by arsenic as decidedly as the more general chorea.

[The dose of liquid potassæ arsenitis was gradually increased to ℥xiv. The patient was able to wash up crockery after she had been in hospital ten days, and was discharged cured on July 3rd.

For three days I tried the experiment of controlling the spasmodic movements by fastening the affected arm against the side. The effect was to make it decidedly much worse. This observation is quite in accordance with the theory I hazarded in an earlier part of this lecture, that the voluntary nervous force is in chorea deficient from want of use, and that the exercise of the directing will is an important element in the cure. For that which is cured by the exercise of voluntary effort you would expect to be made worse by forcible involuntary control, and *vice versâ*.]

Part III.—(*Continuation of same lecture.*)

I must not let you suppose from the usually fortunate result of chorea under treatment, of which you are sure to see repeated examples, that a favourable prognosis can be

always given as a matter of course. It is true that during the time in which you, my present class, have been pupils, there have been no deaths among my patients so affected, nor indeed any discharged as incurable. But in my case-books there are several of both sad sorts, and I will briefly extract them to damp any too cheerful ideas you might have acquired about the disease.

John D., (No. in Reg. 442) aged sixteen, was transferred to me from Mr. Coulson, February 13th, 1852. He had been operated upon for stricture by the perinæal section, and had accidentally been placed in a bed opposite to one occupied by a boy with chorea. He soon began to imitate the choreic movements of his neighbour, and though removed to another ward he got worse and worse, and lost all control over his limbs. When transferred he was found to have pericarditis, but the time of its supervention had not been noticed. He continued to get worse and worse, abrasions and sloughs and abscesses formed in various external parts, and he died delirious Feb. 28th. It is possible that the pericarditis and abscesses may have been due to pyæmia.

Sophia G., (No. in Reg. 5003) aged eighteen, came to St. Mary's on June 15th, 1855, with debility and pericarditis. The only illness she was aware of having had was chorea at four years old, which had not since recurred. Her pericarditis relapsed and got worse, and the chorea, so long absent, returned again. She died worn out with chorea and dyspnœa on July 21st.

Hannah M., (No. in Reg. 746) a needlewoman, aged twenty-three, was admitted November 1st, 1861. Her sister told me she had been deserted by a lover the previous year, and had gradually faded away ever since. Her skin had got brown and harsh, her body emaciated, and her mind sluggish. Then she became feverish, and a fortnight before admission exhibited the usual symptoms of chorea. These were then so bad that she could hardly be kept on the bed. No remedies were of any avail, she grew delirious, and then raving, and then comatose, and died on the 9th. At the autopsy we found (first), some old dry tubercles in the lungs and mesentery, dating probably from her first pining; (secondly), degenerated supra-renal capsules, connected, it may be presumed, with the bronze-tinted skin; (thirdly), a scrofulous tumour as big as a filbert in the lumbar

enlargement of the spinal cord, which probably was recent, and was the cause of the recent chorea.

Two other cases were not fatal, but were not at all benefited by anything they received from the hospital.

Sarah C., (No. in Reg. 24) aged twenty-three, married and full six months pregnant for the first time, was attacked on June 20th, 1851, with acute rheumatism of left elbow and right foot, and at the same time her right arm became affected with chorea. She was free from pericarditis on her admission, June 27th, but got it on the morrow. Her rheumatic and cardiac symptoms subsided, but the chorea was as bad as ever when she went out on July 21st. It continued till her child was born two months afterwards, and then was cured. Had this young woman been in any danger, it would have been worth while to have induced premature labour, but I do not suppose anything else would have stopped the chorea.

Robert F., (No. in Reg. 804) aged eighteen, son of a medical man, was transferred here from a mad-house, Nov. 30th, 1860. He had practised masturbation from the age of seven, but does not appear to have suffered in his health till he was sixteen, when he became affected with chorea for six weeks. He then remained well till the end of 1859, when the disease was brought back again by the same filthy practice I have spoken of. It was of a peculiar description, coming on in paroxysms, principally affecting the muscles of the neck, and twisting his head so far round sometimes as to cause him to tumble down, screaming and barking. He had been in a lunatic asylum, for which of course he was not a fit patient, and had had subcutaneous injections of morphia at St. George's hospital without benefit. Morphia was also tried here without permanent benefit, and also cauterization of the urethra. He was discharged incurable after a month's trial of various expedients.

So you see chorea is not always a disease of so little moment as appears from the bulk of cases, and perhaps from all the cases you may happen to witness during your novitiate.

I will also use the hospital records to point out to you a curious fact in the history of chorea, which happens to be illus-

trated by none of the four patients at present under your eyes, nor in truth by any admitted under my care this session. I mean the connection between it and acute rheumatism. Out of thirty-three cases which I have looked over in my old case-books, in the following six the nervous affection either began during rheumatic fever, or followed immediately after it before convalescence was complete, or else rheumatic fever succeeded to the chorea.

Sarah C., (No. in Reg. 24) aged eighteen, mentioned just now as an instance of the chorea being unaffected by remedies, had both ailments at the same time, but without cardiac lesion.

John J., (No. in Reg. 291) aged sixteen, had chorea immediately after rheumatic fever, but was also infested with intestinal worms. There was no cardiac lesion.

Sophia G., (No. in Reg. 5003) aged eighteen, died of pericarditis, very probably rheumatic, and chorea. I have mentioned this case before among the fatal ones.

Sophia M., (No. in Reg. 6425) aged seventeen, had chorea come on in the hospital during an attack of acute rheumatism, free from any cardiac complication.

Eliza B., (No. in Reg. 6437) aged seventeen, had chorea come on in the hospital during an attack of rheumatic fever, but she had no recent affection of the heart detected then. When again admitted for chorea in the succeeding year, there was a soft murmur, systolic and probably anæmic.

Martha C., (No. in Reg. for 1861, 346) aged twelve, was admitted with chorea. She denied having had rheumatic fever, though she said she had had rheumatic pains. The heart was healthy. Next year she was under Dr. Sibson's care for rheumatic fever, and then again the heart was examined and found healthy.

You will observe, that though the association with rheumatism is evident, there is none made out with previous lesion of the heart. For, though Sophia G. had pericarditis, yet the others had no cardiac affection. Considering how very common inflammation of the central organ of circulation is in rheumatic children,* and that it is at this age that chorea usually occurs,

* It is dependent partly on the natural activity and excitability of muscular

on the mere doctrine of chances they would often coincide; but the cases I have last referred to show that the constitutional connection is really with the rheumatism, and not with the valvular or pericardial injury.

Indeed, when you come to consider that the red contractile tissue in the majority of cases of acute rheumatism is seriously affected in its functions, and in some cases (muscular rheumatism) is the only tissue affected, and that chorea is manifested by a want of control of the muscular nerves over the muscles, a considerable light is thrown upon the relation of two diseases at first sight so dissimilar. They are defects of vital function in the same part. In one case the sensitive; in the other the motor function is injured.

I am sorry to say no practical assistance in their cure has been afforded by the observation of the connection between the two diseases. I have, in a few cases, applied to chorea the same treatment I should have applied to rheumatism, namely, warmth and alkalies, and it seemed to me rather injurious than beneficial. But the inverse inference I have not acted upon, and I do not know but what arsenic might be of use in rheumatism, and should be glad to hear of the experiment being tried.*

fibre in young persons, partly on their intolerance of pain and warmth, and the difficulty of keeping them from throwing off the bed-clothes, and exposing their chest to cold air.

* One such experiment, a decided failure, is recorded at the end of Lecture XVI, page 170, where a boy taking arsenic for chorea connected with old valvular lesion, and of rheumatic diathesis, was attacked by fatal pericarditis, presumed to be of rheumatic type. Jan., 1864.

LECTURE XXXI.

EPILEPSY.

Cases illustrative of the use of iodide or bromide of potassium—Suggested explanation of the benefit so derived—Accessory treatment.

(*Clinical, St. Mary's, June 20th,* 1863.)

The following are the cases of epilepsy which have been in the hospital under my care since January 1st.

Richard L., aged forty-four, a married groom, had never any serious illness before February 20th. On that day, soon after going to his work at seven in the morning, he felt giddy, and in two or three minutes afterwards he became insensible and fell on the stable floor in a fit, during which, his companions told him, he was convulsed. A similar fit occurred the night after, and a third the next day. This was followed by a succession of fits for twelve hours, with intervals of from four minutes to a quarter of an hour. After that he had about three fits during each day. But during the nights they were more frequent, coming on whenever he tried to go to sleep. On the 27th of February he applied for admission, and had an epileptic attack in our board-room. This one was seen to last about five minutes, being accompanied by casting up and twitching of the eyes and slight convulsions. His urine was natural, the genital organs normal in function, and no blow on the head or any other possible cause for the fits detected. He had the air of a sober respectable man.

He was immediately put upon the following treatment ;—

℞ *Potassii iodidi gr. iv,*
Tincturæ cantharidum ℥*xv,*
Mist. camphoræ ℥*j,*
ter die.

A small blister of an inch circumference behind each ear.

The fits never recurred, and he entirely lost the feeling of giddiness and general malaise which had been experienced during their continuance. As his home was in the neighbourhood, he was discharged as cured on March 6th, with a determination to come back if he felt any likelihood of a relapse, to guard against which he was provided with medicine for a fortnight. [He has not since made his appearance. February, 1864.]

A. M., a boy of twelve, had a cut on the head by a fall in fighting at ten years old. After it had healed he was quite well till last November. At that date he began to have epileptic fits. At first they resembled fainting fits, and occurred with various frequency, sometimes as often as seven or eight times a day. Since then they have become of a convulsive character and have occurred mostly at night. When they are coming on it seems to him as if the room were on fire, this is succeeded by sudden darkness, and he knows no more. His mother states that he almost always goes to sleep immediately after the fits. His appearance is healthy, and there are no worms to be found in his stools, though his mother had given him strong purgatives and carefully examined the results. There was ordered for him on March 20th the following prescription,

℞ *Potassii iodidi gr. iv,*
Tincturæ cantharidum ℥*v,*
Mist. camphoræ ℥*j,*
ter die.

Up to March 25th he had a fit each day. His eyes were fixed, and the pupils much contracted during them, and he fell down, but did not bite his tongue.

On April 1st he had at dinner time a short fit, and after that no more. He was discharged cured on the 11th, having taken no remedies beyond that named and two doses of castor oil.

Eliza D., an unmarried nurse-maid, twenty-four years of age, was admitted by governor's order, May 1st, for epilepsy. She had her first fit sixteen months previously, when she was at the Cape with her mistress. At first she was not completely insensible during the fits, and had no convulsions, but soon they took on a more decided epileptic character, and latterly they have come on more frequently, sometimes as often as two or three times a day. The catamenia have never been quite regular to time, but otherwise she has been a healthy woman, except for the epilepsy. She is spare, brown, and intelligent, without any signs of hysteria. She was put upon the treatment by

℞ *Potassii bromidi gr. xv,*
Mist. camphoræ ℥*j,*
ter die.

During the night of the fifth she had two epileptic fits in which she bit her tongue. The bromide of potassium was increased to gr. xx, and she had no more fits.

Thomas K., a G. W. R. porter, was admitted on April 11th during an epileptic fit, which he had in going to his work at four in the morning. He was treated with a turpentine enema and a blister at the back of neck, but as he did not wish to be kept from his work I lost sight of him.

I bring to your notice these last four cases of epilepsy which have been under my care in the hospital, because in most of them a similar remedy has been used with apparently great success. Two have taken the iodide and one the bromide of potassium, and it certainly seems to have controlled the disease in an extraordinary way.

Remark that all these three epilepsies are comparatively recent. I have, as a rule, refused to admit long standing cases, as causing a great deal of trouble and expending in vain the funds of the hospital. And I think that trials of all remedies should be made on recent cases, for confirmed epilepsy has become such a habit in the system that it may be looked upon as incurable. Even there iodide and bromide of potassium will alleviate the evil.

In one case due to an old sabre cut on the skull so long ago as the Greek war of independance, and accompanied by partial paralysis, I gave, in consultation with Dr. Watson, iodide of potassium, and the fits became not only less frequent but milder. Another case of fourteen years' duration and used to recur every three weeks, has now been nearly six months without a fit under the use of fifteen grains of bromide of potassium three times a day.

This latter case had tried to take the iodide, but even in small doses it so soon produced its poisonous effects, sore throat, irritative fever, &c., that it was never fairly tested.

Sometimes we fail. I gave the iodide last winter to a young clergyman for epilepsy of not above a year's duration. During three weeks' stay in London he was indeed free from fits, but on returning home they recurred as bad as ever. Singularly enough I had a few years before given this man large doses of iodide of potassium for non-syphilitic periosteal rheumatism, and it had acted like a charm. Is it possible that the drug can have lost its effect over one disease by having been previously used for another in the same patient? At all events he left it off, and when I last heard he was taking, under advice, mercurial alteratives to act on the liver and so on, not apparently with any advantage.

This class of neutral salts seem to have a peculiar restorative action over the white fibrous tissues. They were first brought under the notice of the profession by the effect of iodine in scrofulous diseases of the glands, and then by their cure of syphilitic periostitis. A notion got into the profession that they had some antagonistic, or controlling, or evacuating power over syphilitic virus; but the more recent surgical writers, such as Mr. Lee, think there is evidence against that idea, and that they benefit by curing the diseases arising out of the presence of the virus and not by removing the virus itself. They cure the patient's tissues, without specially affecting the *materies morbi*, if we may apply that misused term to the poison which is the foreign cause of disease. You may see proof of this opinion in the fact of the equal benefit which they confer in rheumatic and other non-venereal cases of periosteal disease. When recently affected, these patients are restored to health as readily as the subjects

of secondary syphilis; and the apparent resistance in some cases to the remedy is due to the protracted nature of the ailments; just as syphilitic periostitis, when it has lasted a long time without medical aid, is very obstinate also. On the ground, that iodide of potassium has a special restorative power over the white fibrous tissues, I should expect most direct benefit from it in epilepsy to those cases where epilepsy is due to some lesion of the membranes of the cerebral or other masses of nerve substance, whether that lesion be temporary or permanent.

But at the same time I have no data by which to doubt of its curative influence, where the disease arises from lesed nutrition or visible tumours of nervous matter. It may not improbably restore also that tissue to healthy vitality.

Neither should I be disposed to be sceptical of its virtue where a peripheral cause exists for the convulsions. That peripheral cause may be an altered state of some fibrous tissue, and it can hardly act otherwise than through an altered nutrition of the nerve or its envelopes.

It is also something to say that no permanent injury to health, and scarcely any even temporary inconvenience is ever wrought by iodide of potassium. Some persons, misled by an accidental instance or two of lunatics having previous to their lunacy taken this drug, have disseminated a notion that it weakens the mental powers. At the Lock Hospital for syphilis we administer annually some hundred-weights of it, but have never found such a result follow. So that there are no patients affected with epilepsy on whom we are justified in not fairly trying the experiment of its use.

I need hardly tell you how important hygiene is in the treatment of epilepsy. The measures most to be insisted upon are those specially connected with the etiology of the disease in the particular case. Should mental causes, such as fright, anxiety, disappointment, lie at the bottom of the evil, a complete change of habits must be enforced; and that is easiest carried out by a complete change of residence and of companions. The same expedient will also powerfully aid dietetic improvements in instances where the digestive tract is at fault. In such cases a mild soluble animal dietary which feeds the tissues by frequent nourishment, without overloading the stomach by copious meals,

such as the diets of our hospitals, is of the greatest value—of such value indeed, that some even hesitate to accept hospital experience of drugs in this disease as conclusive of their real action. All ambitious intellectual exertion, especially rapid and discursive reading and writing against time, should be absolutely prohibited. But moderate employment of the thoughts, especially on familiar and interesting hobbies, is useful in preventing that stagnation or concentration of the mind upon itself which is so hurtful in all chronic complaints.

LECTURE XXXII.

HYSTERIA.

PART I.—*Hysteria not fatal, but not therefore unimportant—Not a uterine disorder—Its pathology lies between mind and body—Its forms to be divided according as it approaches one or the other—Such a division has a direct bearing on the treatment—Mental hysteria—Treatment, restoration of voluntary mental force, of cutaneous circulation, and of emotional control—Corporeal cause for hysteria—Treatment, tonic to mucous membranes—Effects of tea-drinking—Treatment dietetic.*

PART II.—*Hysterical vomiting—Three cases in hospital compared with some private patients—It is not in strictness vomiting—Diagnosis and treatment—Their difficulties—Hysterical cough—Contagiousness of hysteria.*

PART III.—*Connection between hysteria and insanity illustrated—Medical curiosity about private history of patients—A physician not a confessor.*

PART IV.—*Periods of life prone to hysteria—Blighted affections, lowering diseases, and climate, as causes—Two cases of hysterical loss of voice treated by valerian and shower-baths—Spasmodic cough and spitting of blood in one patient—Advantages of auscultation in the diagnosis of the latter.*

PART V.—*Treatment by ice—Treatment by bloodletting—General conclusions.*

PART I.—(*Clinical, St. Mary's, November 8th,* 1861.)

THOSE who rate the importance of diseases solely by the space they fill up in the Registrar-general's report of deaths, will care very little about the subject of the present lecture.

Hysteria does not show its face at all in that book. The reason is, that whenever it leads to a fatal result, it qualifies itself to be classed either as insanity, epilepsy, or some organic lesion; and thus our pathological friends who pay attention only to what people die of, are apt to ignore it altogether. But this is not a practical way of viewing the human misery you are learning to lighten. The sum total of suffering from hysteria to patients and their friends is very great, and probably equal to that included under most of the names followed by high numbers in the lists of mortality.

The chief thing that should make disease interesting to you is the amount of misery which it inflicts, and the likelihood there is of your exertions alleviating this misery; not the gratification of your vanity by observing how the phenomena during life are explained by the post-mortem appearances. I hope you will not be led by the excellent opportunities for the study of morbid anatomy which student life affords to rate that science as the only glass through which you should look at disease. It is very rarely anything which can be put up in a bottle or made into an interesting preparation or picture, that patients feel, and that it is the business of your life to help them to feel less. The true use of morbid anatomy is to teach the consequences of disease, not the art of healing it, and it is the art of healing which must be the prime object of your work in the hospital wards, and the business of your lives. You must not get a habit of classifying ailments according to parts affected only, or a great many will escape altogether from your nosology, and some you will not believe in at all perhaps. Of others, again, the names will give you altogether wrong notions; and of these hysteria is an instance.

It is seldom I ask you to erase anything from your memory, but—will you please to try and forget for the nonce that hysteria is derived from the Greek word ὑστέρα?* That is the readiest way of avoiding the trap which the name sets open for the educated student. In reality it has no more to do with the organ of reproduction than it has with any other part of the

* Hysteria with the second syllable long, as usually pronounced, means "a festival at which swine were immolated" (*Donnegan*), but I suspect the original designers intended the e to be short.

female body; and it is no truer to say that women are hysterical because they have wombs, than that men are gouty because they have beards. You may see daily in the ward appropriated to uterine cases all sorts of pathological changes of the part in question, without any greater tendency to hysteria than in other women; and on the other hand, hysterical women are all around you, among both in- and out-patients, whose uterine functions are perfectly healthy. Of two women I have examined who were born without any uterus at all, one was hysterical.

Our forefathers, who invented the term still used, seem to have fallen in with a popular notion that the womb really danced about into all the strange places where discomfort is felt. They allowed their patients to think of that mysterious organ as now starting up under the left ribs and causing lumps and pain in the side, and properly enough therefore called "spleen" by classical writers of the Addisonian period, now jumping right up into the throat as a "globus," and now intruding itself into the brain, appearing like a nail driven in—a "clavus"—over the brow and disturbing the senses and passions. You may easily conceive that the believers in such superstitions were not trustworthy practitioners; but you will be equally bad if you fall into the error of treating hysteria as a disease originating in the womb.

Observe impartially the phenomena in those cases which come before you, and you will not fail to be convinced that the deficient vitality of which hysteria is a manifestation is in that puzzling part of the circle of life which lies between spirit and matter. We know so little about the chain which connects the two, that its links are reckoned by us as few and short, and we have no names for any of them. Yet when we see the varied phenomena produced by breaches or impediments to the connection, we are led to feel the depth of our ignorance on the subject, and to conjecture that these abysses of incertitude veil a long list of vital functions.

In default of names for even the healthy functions of this part of life, we must not expect an accurate nomenclature for their aberrations from health; and the most we can do in trying to classify forms of hysteria, is to trace how near their origin lies to one or other extremity of the series of vital actions which are interfered with; what relation their phenomena

bear on the one hand to mind, and what on the other to body. We shall thus have set in a natural series the varieties of the disease, with pure insanity at the one end, and epilepsy traceable to organic lesion at the other. Such a nosology has a directly useful bearing on our treatment of the patient, which I cannot affirm of any other attempt at classification of hysteria that I have yet seen. I say it has a direct bearing on our treatment of the patient to observe in each individual case whether the disease is most related to deviation from mental or bodily health; for I feel convinced that it is only by this observation that we can avoid such disappointment as leads many in our profession to look upon hysteria as an *opprobrium medicinæ*, which makes them feel the same sort of anger against it that is roused by moral guiltiness, and disposes them rather to punish than to cure the patient who has thwarted them.

After this unusually long introduction I proceed to the business of the day, by calling your attention to three cases we have visited during the last week in the larger female ward.

The first couch we come to is tenanted by E. J., a nursery-maid aged seventeen, who was brought here from her bed in her night-dress and wrapped up in blankets, as an "urgency" during the week. She complained of dreadful pain and absolute loss of power in the legs, so as to be quite incapable of standing. She said that five days previously her legs had been red and swollen, and that they had been rolled up in "bandages twenty yards in length;" though in the same breath she declared that they were so painful that she could not bear them to be handled, and that it made her faint to have them touched. This illness she attributed to having caught cold, accompanied by diarrhœa, when with her mistress at the seaside, whence she has just come back. She complained also of stiffness and severe pain in the muscles of the neck and of pain in the heart, and of excessive perspirations. In short, she gave a fair description of the symptoms of an attack of rheumatic fever, and in truth she was sent to bed as a case of rheumatic fever, and so entered in the "Urgency admission book." But my eyesight did not let me concur in this diagnosis. The legs and feet were evenly smooth and white, and she did not cry out when any part was handled except the calves, to which she said the pain

had retreated. Now the pain of rheumatic fever retreats to the joints, and not to the calves. Moreover, there was no swelling of the neck which she said was so painful; and, on diverting her attention, the cardiac region bore pressure without her flinching. And the flushing of her face seemed not due to fever, but rather to mental excitement. Then we noticed that the inside of her lips and her tongue were pale, and that the latter was indented by the teeth; whilst there was a soft, soughing murmur, such as you find in anæmic persons, synchronous with the first sound of the heart. But what mainly led me to the diagnosis which I formed of hysteria was the expression of her countenance. She has an easily flushed skin, delicate features, quickly answering to the movements of the mind, and in the eyes a peculiar appearance which requires a separate sentence to itself. The balls are large, and the sclerotic of a transparent sky-blue; the pupil is much dilated, giving a general dark hue to a naturally light eye, and the conjunctiva is smooth and bright from being overspread with tears on every emotion. The eyelids are large, full towards the outer canthus, giving a drooping, appealing expression to the face. I believe this is what ladies technically call "a sweet expression." Of these several hysterical marks, the puffiness of the eyelid and the dilatation of the pupil are the most constant—indeed are seldom absent—and seldom deceive you.

Her history has oozed out in driblets during the four days she has been here, and has been made up partly by a motherly old woman in the next bed; for it excites her too much to attempt much cross-questioning. I would commend to your imitation this mode of piecing up a history by what can be extracted from the patient by those who can listen at leisure. Exciteable persons are prone to exaggerate, to invent, to forget, and to appear to you impostors when cross-questioned by a stranger.

It seems that E. J. has been in service since she was twelve years old, and enjoyed capital health till sixteen months ago, when she had a sad shock. She went home for a holiday, having heard of no illness in her family, and found her father in his coffin. This completely upset her. She has shifted about from service to service, and has always been obliged to leave

from inability to get through her duties. The first bodily symptoms she perceived were langour and a palpitation of the heart on exertion; then she became subject to "fits" as she calls them; if anybody made her laugh, she could not stop, soon began to cry and to scream, and fell into very low spirits afterwards. During this period the catamenia flowed for the first time last December, and appeared again in January: she says that she was neither better nor worse for the change of constitution. Since January they have been absent.

This is a case of hysteria arising from a distinctly mental cause, and showing itself in mental symptoms. The organs first affected are those which are especially obedient to the emotions of both pain and pleasure. First the heart; then the risory, lacrymatory, and expiratory muscles. In health, we know how these are affected by changes in the mind, but are still under its control. When then we find in a patient that control deficient, and when we can trace the deficiency to a cause purely mental, it is rational to conclude that the broken link is nearer to mind than to matter, and it is rational to let this conclusion govern us in our treatment.

I would here again warn you, as I did at the beginning of the lecture, against associating hysteria with the reproductive organs or functions. To read some male authors on this subject one would suppose that it was only a euphemism for lust. A signal injustice is thus done to the weaker sex, and they might well ask, as Æsop's lion did of the natural historian, if women wrote books on the diseases of men how would the creatures be described? If you study in an unprejudiced spirit the histories of the numerous cases of hysteria which fall under your notice you will learn that the sexual instincts are not oftener the moral cause of the disease than any other social circumstances, and that physically the differential organs are less frequently at fault than any of the important viscera. Neither are lustful desires the consequence of hysteria any more than they are the consequence of all that weakens the mental powers, of all that lowers our species in the scale of creation and brings us nearer to other animals. Emotional hysteria is a primary disease of the mind as much as lunacy is.

As in lunacy, so also in hysteria, there follow morbid pheno-

mena connected with the manufacturing viscera. The stomach loses its power of digesting food enough to supply the waste, and the person becomes anæmic. Then the destructive metamorphosis is checked too, the urea is excreted in diminishing quantities, and the unrenewed blood supplies no colouring matter, so that the urine is pale and watery. In short, the patient becomes anæmic; and with anæmia, of course, there is a deficiency in the sanguineous excretions especially. Thus in this girl, as you have heard, puberty truly began in spite of the illness; but power was wanting to carry on its periodical evacuation of effete blood. The catamenia flowed twice, and then ceased. Next to the stomach probably ranks the uterus in its liability to be affected by the mind—a fright may suspend the catamenia or cause miscarriage in a perfectly healthy woman; and in female lunatics the courses are scarcely ever regular—so that it is quite in accord with analogy that the same defect should occur in the half-mental affections which we reckon as hysterical.

Next notice the treatment.

First. She was taken into the hospital as an in-patient. You will find in practice that however good your theory of the treatment of hysteria may be, it is much more difficult to carry out and much less effective when the patients are at home than when you can remove them for a time from their ordinary habits and associations. It is not merely that unprofessional nurses fail to obey implicitly your orders, from misplaced tenderness or ignorance; but that the patient's mind, by running in its habitual groove, and being perpetually subjected perhaps to the influences which engendered the disease, less readily takes a turn towards health. If you expect in private practice to be as successful as hospital physicians, you must try to imitate the circumstances they have in their favour. This is most easy in the poorest and in the richest classes. The first can be sent into an hospital; and with the latter a thorough change of scene, under the charge of some judicious friend, is not difficult to arrange. But this is often next to impossible for the families of farmers, retail shopkeepers, curates, village doctors, and the like, from the union of a light purse with a weighty feeling of independence. One good plan that can sometimes be adopted

to the saving of pride and pocket together, is to negotiate an exchange of patients, where two families of about the same social standing are simultaneously afflicted with an hysterical member. The relatives of A can take charge of B, and the friends of B repay the debt by their care of A. Mere kindness even may induce people to receive on a visit such inmates, if it is pointed out how very valuable the kindness really is, and what a high office of Christian charity is thus fulfilled, when a sick person, incurable at home, is rendered curable by removal.

In the wealthier classes the complete renewal of mental associations involved in foreign travel is a mighty engine of cure. But yet if an hysterical patient be sent abroad during convalescence, you must not be quite careless where you send her to. Some places enjoy a bad pre-eminence for producing relapses. These are generally low-lying places of even temperature; and I suspect there is some connection between malaria and the induction of the disorder. Rome is an instance in point. I was much struck, when residing there a few years ago, by the frequency with which all disease was modified by hysterical phenomena. And one case I saw of well-marked catalepsy, which strongly impressed me. It occurred in an English lady who never had hysteria before in any form, and who was excessively frightened by the unfamiliar symptoms. It came on within twelve hours of her arrival on a muggy spring evening, when she was fatigued by her journey, and open to all the injurious aërial influences of the Campagna Romana. During her stay she was from time to time threatened with a recurrence, and feared she was a destined victim of nervous invalidism; but on leaving Rome the symptoms vanished, have never recurred, and were thus proved to be wholly due to the peculiar climate. Be careful that your hysterical patients keep clear of the Eternal City.* Much harm is often done by sending them to travel in Italy without a warning on this point.

* A reviewer of the second edition of this volume throws a doubt on this accusation against Rome. I was not aware that it was new; but if so, I am glad to find it confirmed by Dr. Scoresby Jackson in his recent excellent work 'On Climatology.' He describes the climate as productive of "a morbid nervous sensibility;" and afterwards advises that all cases "of perverted nervous sensibility" "should avoid Rome."

Whatever be the scheme adopted for securing a change in habitual trains of thought, the principle of treatment will be the same. You must aim at bringing back the control of the mind over the body. A link has been dropped, is becoming paralysed for want of use, and must be renewed. Let the patients be exercised in voluntarily obeying specific orders for the direction of the will; moving the limbs to time, at first slowly, and afterwards with more liveliness, till at last the culminating point of dancing can be arrived at. This is the crisis of the cure; and when a girl can be induced to join a quadrille in the evening, you need not fear a relapse into hysterical paralysis. In the hospital we are obliged to substitute "dull mechanic pacings to and fro," assisting in the work of the ward, &c.; but these are much better than nothing. The same strong effort requisite for these exertions is to be used to restrain the tendency to hysterical fits. The truth is to be forced upon the patient that she *can* learn to repress these manifestations of weakness; and with the learning will come the power, and with the power the absence of occasions for exercising it.

What you have to aim at is exactly the converse of the arts of the electro-biologist, mesmerist, and medium-showman. These persons, with devil-like ingenuity, find means to induce a form of artificial hysteria in subjects with a tendency to mental disease; that is to say, they partially destroy the control which the mind has over the body, and subject it to the suggestions of their own will. Let it be your happier task to restore this control by inducing the patients to exercise it for themselves. Above all things, never be led by curiosity or idleness to repeat the experiments alluded to. Each time that poor creatures are so practised upon, they become more and more enslaved to the morbid impressions, till they lapse into permanent hysteria or even insanity. You might just as well give a man pneumonia, or break his leg, for the purpose of studying the consequences.

Secondly. Shower-baths were ordered to be given every morning. The making up the mind to the shock of a cold shower-bath, is a capital exercise of the will. In summer it is most suitable; and I dare say you remember in July, 1860, a farmer's daughter whom our late house-surgeon, Mr. Ash, sent up from Cornwall with absolute paraplegia of both legs. This

case excited much amusement at the time, because is was attributed by the girl's neighbours to witchcraft. It was due to hysteria; and she was ordered a shower-bath twice a day, with the effect of enabling her to walk one day to the Pantheon, and another round the Serpentine, before she went home cured.

I say "cured," partly because I have lately heard from Mr. Ash of her really being so, and partly also because I should anticipate the best results from the slow progress of her improvement. It is sometimes possible by a strong mental emotion to overcome suddenly nervous paralysis. You have all, I dare say, read at school Herodotus' story of the dumb child of Crœsus, who in a battle recovered his speech, and stayed the soldier's uplifted sword by crying out "Spare my father." I know a case of permanent hysterical paralysis which was several times suddenly cured, once by the house catching fire, once by the patient's maid being struck down by cholera, once by an obstinate physician desiring her to rise up and walk. After each trial she was able to move about for a few days, but she relapsed again as bad as ever, and remained paralytic till her death from other causes. Gradual cures are indubitably the most trustworthy.

In winter a shower-bath twice a day would be rather a strong measure; and it is better to prepare the patients for it by the use of a tonic warm bath, such as the following, which you often see me order;—

℞ *Acidi hydrochlorici diluti* ℥iss, *aquæ calefactæ ad* 95° *Fahr. congios xxx. M. Fiat balneum.*

Shower baths have also a good influence by arterializing the cutaneous circulation. Their immediate effect is to drive the venous blood home to the heart and lungs; and that which takes its place is arterial, as every one knows who has reflected on the pink cheerful glow of his person while drying himself after this morning luxury.

Thirdly. Valerian was ordered to be taken three times a day. There are several substances dowered with a special action on those nervous functions which minister to the emotions. They come from different kingdoms of nature, and agree in no one point except in having all a very strong smell. The essential oils of sundry plants which are the pride and profit of the perfumer, the rose, bergamotte, tuberose, violet, hyacinth, fresh hay,

and some others of the few sweet scents that exist in the world, are poisons to all with a tendency to hysteria, and are proscribed by universal consent of fashion in all places where the disease is endemic. In Rome, you would as soon think of going to an evening party with a drawn sword as with a strong-scented nosegay, in any hope of its acceptance. Tea is equally baneful, and the bad effect seems to dwell rather in the essential oil than in the alkaloid which it holds; for coffee, which is as rich in theine, is by no means so hurtful. On the other hand, the bracers-up of the nerves would seem to have this good gift in recompense for their peculiar offensiveness in their raw state to the healthy nose—valerian, assafœtida, garlic, castor, musk, and I believe some others whose disagreeable virtues are not familiar to me. The first two are the best; as, though musk is very beneficial, its high price and the unbearable permanence of its odour renders its use inexpedient. In hospital, you will generally see me ring the changes upon the following perscriptions :—

℞ *Tincturæ valerianæ compositæ* ʒ*j*, *Infusi valerianæ ad* ℥*j*. *M. Fiat haustus ter vel quater die sumendus.*

℞ *Assafœtidæ gr. x in pilulis ter die sumenda.*

℞ *Spiritûs ammoniæ fœtidæ* ʒ*j ex aquâ ter die sumendam.*

But in private practice more elegant substitutions can be made to suit the patient's fancy, such as—

℞ *Tincturæ castorei ammoniatæ* (*Pharm. Dub.*) ʒ*ij*, *aquæ fœniculi ad* ℥*j ;*

or—

℞ *Pilulæ galbani compositæ gr. x ;*

or—

℞ *Zinci valerianatis gr. iij ;*

One or other to be taken three times a day.

You will remember, I hope, that drugs, whatsoever may be their powers, can never take the place of other treatment. They are merely an aid and a means by which the essential principles of restoration may be carried out; but if they be trusted to empirically, if the disease be prescribed for and not the patient, failure will attend your best efforts, and a disappointed scepticism haunt you in or drive you out of our God-like occupation.

The next case before us is an instance of hysteria exhibiting a more material ailment from a more material cause.

Maria E., a muscular matron of forty-two, was confined of her eleventh child nine months ago, and had gone on letting it suck till the other day. Very little milk there was for it indeed; and the only use of the nipple must have been as a sort of opiate. Notwithstanding its difficulties, by dint of other food the baby has grown fit to be described as a "beautiful fat" one; but the mother has been severely punished for kicking against the pricks of instinct. Four months ago she was taken with a succession of fits, which drew her arms and legs up in convulsions, and took away her voice. She was sometimes quite paralytic, and sometimes lost her senses, but never bit her tongue. Then she became afflicted with dyspnœa, which, even now as she lies in bed, cuts short her speech, and is constant when she is up. Her appetite is quite gone, so that she loathes the sight of food. She has also excessive pain in the left hypochondrium, which often, in her own words, "quite doubles her up," but yet does not arise from flatulence. The catamenia have returned at their proper periods, in spite of the illness brought on by her too persevering attempt to suckle the child.

You may see here again the hysterical eye, with large pupil, clear sclerotic, full upper eyelid, and look of appeal for sympathy. This time it occurs in a brunette, and in a woman whose face might have led you to guess her to be of a stern, strong-minded, or ascetic character.

Now the treatment here is different from the last. She was ordered for medicine—

℞ *Tinct. cinchonæ co.* ℥j, *decocti cinchonæ ad* ℥j. *Fiat haustus ter die sumendus.*

She was kept quiet in bed, and bidden to take a cup of limed milk every two hours. I looked upon the chain of causation in this case as arising thus—(1) exhaustion; (2) imperfect gastric digestion; (3) anæmia; (4) innutrition of nervous system, and the consequent exhibition of its weakness in hysterical phenomena. And I considered that the easiest channel by which to commence the renewal of life was the stomach. It would have been useless to load the poor organ with a quantity of heavy victuals, which it could only have relieved itself by rejecting. But frequent small amounts are not beyond its powers; and if you give these as medicine, the patients will not think them-

selves at liberty to choose or refuse, as they do food. Medicine indeed it is; for it is intended to cure the stomach of its anæmic, inert condition, and thus to give an appetite. The cinchona is designed to have the same effect, by astringing the surface of the mucous membrane, checking its secretion of sticky mucus, and thus enabling the gastric juice to reach the food. And you see that between them the effect is brought about; for, as we went round to-day, the patient said her desire for food was coming back, and of her own accord asked for meat. The pain in the splenic region was much better, and the dyspnœa gone.

Wondrous is the power of the stomach! When in its right senses, what a restorative physician it is! By the aid of our patients' stomachs alone we can cure nine-tenths of the curable cases of disease. Persius dubs it a "Master of Arts;" I would give it the degree of "Doctor of Medicine."

Another case of hysteria with a traceable bodily cause came to us on the same day.

Maria D., a spinster of thirty-two, has been a general servant in a light place for seven years. She has been happy, and has enjoyed pretty good health, interrupted only by occasional headaches; but for some time lately things have seemed to annoy her more than they ought to do. Three months ago, she had a bad "bilious" headache, which was followed by some fits of laughing and crying. Five weeks ago she had an attack of diarrhœa, from which she got better, and went to work again in spite of weakness, for she was loath to let her mistress want her. But her exertion was in vain, for she no sooner tried to clean a grate than she fell down speechless, and had a succession of hysterical fits, losing her senses, but not biting her tongue. Then she began vomiting everything she took, and this had been going on for three weeks, and seemed to amount to a complete rejection of all her food immediately it was swallowed. When you saw her, there was excessive flatulence, the air bursting up from the stomach in roaring eructations while one was talking to her.

In this woman, the effect of the wide pupil and sympathetic hemiptosis is not hidden even by the disfigurement of blear edges to the eyelids; and it quite accords with the droll earnest-

ness of her manner, which increases gradually as you let her go on talking about herself, leaving no doubt of her strong hysterical diathesis.

As to cause, that is still more directly traceable to the stomach than even in the last case. It would seem that for some years she has been becoming more and more given to tea-drinking. She confesses to caring for little else, so long as she could get her favourite food or physic—or poison—I do not know exactly how to call it. Her mistress was quite angry with her for eating so little meat; and, with a far-sighted economy not common in her class of life, took much trouble to keep up the health of a faithful servant. But her weakened stomach refused meat, and she was literally starving in the midst of abundance.*

In this case, diet will be the cure. When we can make our patient a carnivorous animal again, she will be well. But what is the use of diet or medicine when it is all thrown up?—none —With this feeling, at the same time (Nov. 1st) that I ordered her limed milk every two hours, I added also an enema of half a pint of mutton broth four times a day. On the 5th, about half the liquid swallowed was retained, and she complained that the anus was made sore by the clyster-tube. The enema was therefore omitted, and the power of resisting nausea was aided by four minims of prussic acid every four hours. On the 7th, she vomited scarcely at all, and said she would try and keep down a piece of meat. This she has continued to do, and may be now counted convalescent.

Part II.—(*Clinical, St. Mary's, May 16th,* 1863.)

I will call your attention to-day to a case of hysterical vomiting, namely that of Hannah P., aged eighteen, who has been in the hospital a fortnight. She is a respectable farmer's daughter, and seems to have been much petted at home. She has large black pupils to the eyes, and puffy eyelids, and allows

* This patient has just returned to the hospital. She has been well from the date of her discharge till a fortnight ago, when she sat up several nights, and was very anxious about her sick mistress. This has caused a return of hysterical vomiting. Feb. 1864.

that before her present illness she used to have hysterical fits, but not since she has suffered from what she came here for, namely, chronic vomiting. I should rather call it a rejection of food, for it occurs immediately after food has been taken, almost before it is swallowed. This happens at every meal, and has lasted a year and a half, and during that time she has been for a short time in her county hospital with relief but not cure. She has also pains in the back and in the splenic region. She declared she was unable to walk or even to stand without assistance, and when placed upright in the middle of the room she fell down at first. Nevertheless, after a scolding and a decided command to exert her will vigorously, she at last began to put one leg before the other, and progressed a few steps even on the first day. The catamenia had been absent three months, and indeed had never been established at regular periods.

There is a peculiarity about hysterical paralysis which in a great many cases guides you to its nature—and guiding you to its nature is here more than anywhere a most important step in the cure. When you set the patient up on the floor, assisting her with one or two hands or with your hands under the axillæ, according to the degree of paralysis and the amount of aid wanted, the body is immediately thrown forwards, and all your strength is called for to prevent her falling on the face. Other paralytics fall to one side or the other, or backwards, and do not stumble forwards in this way. The peculiarity is well marked in the present instance, and has aided the diagnosis.*

This is an example of that extremely troublesome disease "hysterical vomiting;" by which I mean a vomiting of food independent of any organic or anatomical alteration of tissue, and due to mental or functional deficiency of the nervous power of control. The pathology of the disease seems to be this;—when the food enters the œsophagus the lower muscular fibres being deprived of proper cerebral control act too soon, and the

* This girl, after retaining mutton chops and porter for a fortnight, and exhibiting her muscular powers by a walk to Oxford Street and back, went home well July 13th. I hear from one of my pupils that she has this winter not only relapsed into her former condition, but has communicated it to a neighbour of her own age. Dec. 1863.

upper muscular fibres are too soon relaxed, so that the morsel instead of being pressed downwards into the stomach is returned back again to the mouth. Unlike other persons, the hysterical are unable to check by a strong voluntary effort the conversion of nausea into vomiting; and often, if they are able, they are unwilling to do so by reason of the peculiar perversion of their minds.

The difficulty of the diagnosis lies in the proverbial difficulty of proving a negative. It is not wise or honest to make an off-hand statement that no organic change of tissue exists to account for the phenomenon. And moreover I believe that long continued hysterical vomiting may lead to organic change by the unnaturally empty state of stomach which it perpetuates. It may lead to congestion of the mucous membrane, and thus to ulceration. You must watch your patient carefully and note all indications of the organic disease or the contrary before you decide; for though with the hysterical temperament it is the most common case for no actual lesion to be found, yet the chance of it is not entirely excluded.

But the first thing to do is to observe whether the hysterical temperament exists. For this knowledge no guide is so sure as that peculiarity of eye and manner which I have often described to you, and which is so strongly marked in this instance that there was but little question as to the nature of the ailment being at all events much affected by it.

In the treatment I adopted a plan which has been justified by success, and which is also justifiable on rational and physiological grounds. I ordered that food should be taken only in small quantities, but frequently, and always in the standing posture. She was made to stand up and eat every hour. The object of making the patient swallow only whilst erect, is to give the œsophagus the aid of the force of gravity and also to relieve it of that muscular effort necessary for its action when horizontal. The method is of essential importance in the treatment of functional regurgitation, and is also not without its use in cases due to organic change, ulcerative or malignant. I am surprised not to find it alluded to in practical works on the subject.

The view proposed by cold shower-baths is the strengthening of voluntary power. The warm season we are having has

allowed of their being taken twice a day, but in colder weather that is often too much, and may bring on catarrh or catarrhal rheumatism, or catarrhal sore throat. Indeed one bath a day will sometimes do that in this chilly climate. A good precautionary measure in females is to guard the head from the water; for the soaking of their long hair keeps it wet for an hour or more, and is more apt to give catarrh than the shower-bath itself.

Hysterical vomiting is more difficult of cure by mere drugs than any other manifestation of the diathesis; for the usual entrance for your means of cure is barred against you. I say designedly "barred," because really the articles swallowed do not get into the stomach; they are not, strictly speaking, vomited, and the phenomena are in fact more analogous to those of œsophageal stricture. For this reason, the emaciation is not so great as in chronic cases where the stomach is emptied by true vomiting; for, though thrown up immediately, and to all appearance wholly, yet in reality some of the mass swallowed slips through the spasmodic grasp of the œsophagus, descends into the stomach and keeps up the nourishment of the body.

You need not, therefore, be in so much alarm about hysterical vomiting as the symptom would at first appear to justify. The patient will not be starved so soon as the friends expect, and there is plenty of time for judicious treatment to be adopted and to act.

In this form of hysteria, as in those with more obviously mental manifestations, a change of scene and habits has a marked effect, even although the present circumstances are not deleterious. I do not think you would have seen so quick cure of this woman at her own home.

I had a whimsical instance of this last-named fact in a maiden lady aged nineteen, who was sent up to me by Mr. Ayres, of Ramsgate. After a preface of hysteria, she had had daily rejection of food for six months, sometimes of everything taken, but always unchanged in appearance, showing the vomiting to be œsophageal and not gastric. Soon after she came to London she got well. She went home to Ramsgate; and, being soon afterwards frightened by a chimney on fire, was taken with her old vomiting again. She returned to London; and the same

day without any remedy the vomiting ceased, and she swallowed everything easily. It was the most "*veni, vidi, vici*" cure I ever saw.

Not but that care and decision will enable you to be victorious sometimes even in cases where removal of dwelling is impossible. Dr. Woodhouse, of Hertford, called me in to see a case of vomiting in an hysterical young married lady, where, either from misplaced catamenia or congestion from retching, blood was thrown up in considerable quantities. We succeeded in entirely removing all food, and in feeding her with beef-tea enemata for a fortnight, after which she gradually got back by the steps of spoonfuls of milk to ordinary diet, and was cured completely. But Dr. Woodhouse quite tired himself out by the watchfulness and decision he had to exert to get this plan carried out. Several times we were almost driven to despair of success. You must be ready for a course of decisive and sometimes unrequited labour in managing such cases.

I extract from my note-book of a few weeks ago a case analogous to the last, in so far that the deficiency of healthy control was exhibited in the same set of nerves, namely, the pneumogastric, but exhibited in a rarer form.

Fanny T., aged twenty-one, was last year thwarted in hopes of gratifying at once her affections and ambition by a very advantageous marriage. She is a reserved proud girl, and very determined to make no sign of weakness by showing herself as low-spirited or hysterical. She had made up her mind to be independent of marriage altogether, and with a view of securing fame and fortune in the world of letters had been working very hard at French, German, and Latin literature. In consequence her general health was failing, the bowels became costive, and the catamenia had been irregular the last six months, occurring sometimes every fortnight, and sometimes having intervals of five or six weeks. She had also got thin and strangely lost her muscular strength, so that she was tired with the least walk, and dropped from sheer debility articles of furniture and the like which previously she was used to carry with ease. For the last three months she had been troubled with a cough of a peculiar

loud barking character, very spasmodic and uncontrollable, unaccompanied by any pain, and not followed by any expectoration. At first it used to come on only when she was exhausted with actual exercise, but latterly it had got much worse, and was excited by even the effort of speaking to any one or by seeing a stranger, or even by allowing her thoughts to dwell long on any exciting subject. She had taken large quantities of expectorants and felt confident that they made her worse: the breast was red and raw from the application of mustard poultices without even temporary benefit being derived therefrom. In fact, no medicine had done any good.

A stethoscopic examination of the chest showed the lungs and heart to be quite healthy and remarkably well developed. But what surprised me more was the absence of hysterical manner and aspect, and the extremely reasonable way in which she spoke about her ailments. It was more from the history and her own statements, than from my own eyes, that I was able to guess at the hysterical diathesis.

I look upon this as an instance of a strong external disposing cause overcome in a great measure by a still stronger will. In a weaker minded woman it would probably have resulted in the extremest hysterical phenomena, in her it acted only locally on one set of nerves. I dare say at a future time I shall be able to show you examples of the same thing in patients under your own observation.

It is worth while to notice in passing an illustration we have also had of the contagiousness of hysteria.

Elizabeth W., aged eighteen, has been in hospital many weeks with several relapses of rheumatic fever coming upon a long diseased heart. She has been all along somewhat disposed to hysteria but never so much so as to require special remedies. Our patient with hysterical vomiting, Hannah P., being up and about, was appointed by the nurse to give her her food, and was brought into familiar relations with her. In a few days Elizabeth W. began to vomit her food also, and this led me to order her valerian. The drug, a good scolding, and the removal of the contagious intercourse with Hannah P. soon put a stop

to the additional ailment, and I have bidden her continue the valerian as a preventive and tonic.

PART III.—(*Clinical, St. Mary's, February 5th*, 1863.)

In the case of Elizabeth P., who has just left us, you have seen an example of the connecting link between hysteria and insanity. She is a servant out of place, aged twenty-two, muscular and well-made, but thin, and of leucophlegmatic colour and aspect. She was sent in as a case of inflammation of the bowels, and I found her in bed loudly complaining of violent pain in the abdomen equal in external manifestations to that caused by peritonitis. But then she lay twisting herself about, and when I put my hand on the part she immediately contracted strongly all the muscles. People attacked with peritonitis do not do that. She gave moreover no history of shiverings, or of any probable cause of peritonitis; whereas that inflammation is always preceded and accompanied by rigors, and can generally be traced to some definite occasion. Then she buried her face in the pillow, avoided my gaze, and when pressed to look at me, did so with a quick startled glance, and quickly turned away her eyes. The pupil was widely dilated, the sclerotic sky blue, giving the organ a much brighter and blacker appearance than is consistent with her blonde complexion. There was the hysterical droop and fulness in the upper eyelid. The catamenia were regular, and she had no leucorrhœa. The urine was very pale, copious, and of a specific gravity only from 6 to 7 parts in 1000 above that of distilled water. This again was fatal to the diagnosis of peritonitis. There was a great abhorrence of food, but no vomiting, and it did not seem to cause any inconvenience when swallowed. On all these grounds taken together I set it down as a case of hysteria, psychical rather than bodily in its manifestations, and depending rather on moral than on material causes.

Subsequent information has seemed to confirm this view. There is some sad point in her private story which seems to have been the starting point of her illness. What it is I do not know, and more than that I do not care to inquire; for I

believe inquiry would do more harm than good; the fact is enough. You will often be tempted by natural interest and a pardonable curiosity to elicit romances of real life from your patients. And there is an agreeable sense of responsibility in being the honourable guardian of a secret. Women more especially, from an innate love of confession, will favour this, and are only too ready to make you a confidant of their own and others' histories. Check yourselves and check them, directly you have heard enough to direct your treatment of the case. Overmuch sympathy with mental distresses and passions makes you a less efficient medical man; even the appearance of sympathy weakens your influence in many hysterical cases. It is your business to discourage a morbid dwelling on the past, and to strengthen that English reticence which leads us to bury our sins and sorrows in some out-of-the-way corner of the memory, and to resent the prying curiosity of medical or spiritual attendant.

The diagnosis of hysteria was confirmed even before we left the ward by the patient going off into a violent attack of noisy sobbing; and the nurse told me that a few days afterwards something made her laugh, and she was quite unable to restrain the most violent and painful cacchinations for a quarter of an hour. But it also appeared that before her admission she had had temporary delusions on various subjects, and often her manner in the hospital was that of a melancholic. By dint of valerian and daily shower-baths she got much better, and was able often voluntarily to keep off hysterical paroxysms, when she heard that having them would entail a shower-bath in the afternoon and at night as well as in the morning.

But her frightened insane manner she did not lose till we were able to set her to work helping the nurses to wash the crockery, run messages, and wait on the patients. This was much better than the dull walks up and down the garden, which for some time was all the voluntary exertion she could be got to make, and it quickly wrought a cure.

PART IV.—(*Clinical, St. Mary's, November 14th,* 1863.)

In the case of Ellen —— who left the female wards two or three days ago, cured of hysterical vomiting by valerian and shower-baths, there are a few circumstances worthy of practical note.

She states that for the last three years she has scarcely ever passed a month without an attack of vomiting accompanied by great depression of spirits. These attacks however seldom last above four or five days and are usually cured by stimulants. Last August she went to Eastbourne along with the family where she lives as cook. It was against her will that she went, for she says the seaside never agrees with her. Whilst there she had an erysipelatous inflammation of the foot, which laid her up for a short time, and her spirits got depressed. Then a very bad attack of her old complaint came on; she vomited after all her food, and continued to do so till her admission to the hospital, October 22nd, after she had gone on suffering in the same manner for two months.

She is a tall dark unmarried woman of thirty-three; she has an imposing aspect, with a fine looking mouth and jaw; but yet she has the hysterical eye. Or at least she had it on admission, for her expression is a good deal altered since she came. She has never experienced paroxysms of laughing or crying, and is used to conquer her depression of spirits by an effort of throwing it off. She seems a person of strong hysterical diathesis checked by sound good sense and powerful will, in whom the diathesis would not have developed into external manifestations without considerable motive causes. These motive causes may be traced in her history.

You observe, first, her age. A single woman between thirty and forty is in circumstances which have a great influence on the mind. She feels that her chances of a settled and natural home are daily becoming less and less, and that the affections she might expend on a house, a family, and a husband, are being wasted and withered. Hence their tendency to all mental and semi-mental ailments.

Secondly, early in life her affections were cruelly deceived and blasted. Long ago she was an unmarried mother, and has ever since suspiciously shunned the chance of a similar disappointment.

Thirdly, her bodily vitality was lowered by the depressing illness of erysipelas.

Fourthly, she was in a climate which tended to aggravate the predisponents already named. Many hysterical persons are made worse at the sea-side; and moreover close to Eastbourne there are some recently drained marsh lands, whose crop of malaria is in certain states of the wind blown towards the town. The eastern side is especially exposed to this. Now malaria is very poisonous to all nervous patients: it does away with all the advantage of the fresh sea breeze and the change of scene.

It is in such cases as this, where there is under ordinary circumstances a balance between the disease and motive causes on the one side, and the natural cure of strong will on the other, that you find the more irregular forms of hysteria developed. And I must frankly say they are not easy to recognise, and often difficult of cure.

I kept this woman at first in bed for a few days, in order to give her perfect rest, and to enable her to do without more than a very small allowance of nutriment, namely, milk and beef-tea given in doses of about two ounces at a time. This broke to a great extent the habit of vomiting. Then she had a teaspoonful of tincture of valerian every four hours, and strange to say its nauseous taste produced no nausea. The cure was completed by a week's course of daily shower-baths. The woman herself was much struck with the effect, and in spite of this dreary weather said she was determined to go on with them at home. Her mistress will doubtless accede to this plan of keeping an active servant in vigour, and armed with a prescription for valerian drops I think our patient is qualified to be her own physician.

Compare this now with the next case. Jemima T., a housemaid, aged twenty, has at present hysterical aphonia. She was originally admitted September 28th for severe œdematous angina. She had been salivated before admission, and was further reduced through the loss of blood by leeches, uncompensated by diet. For swallowing was so difficult to her, that

she was nearly starved. At first I attributed the loss of voice, remaining after the angina was well, to paralysis of the vocal cords from the long continued œdema in the neighbourhood, especially as the edges of the glottis could be seen by the laryngoscope to be somewhat red. But when we made the attempt to apply galvanism internally to the cords, the true nature of the aphonia was made known to us by her having an hysterical fit of a violent convulsive character, in which she screamed out lustily in a high musical note. I immediately ordered her cold shower-baths daily and valerian. She has had no more hysterical paroxysms, but shows in the shower-bath her talent for holloaing, and the voice is acquiring a tone.

I have brought forward this case in order to remark that where any special lesion has existed, hysteria will very often choose the lesed locality for its manifestation. This is puzzling to you in practice, because you do not know when to cease treating the lesion and to begin treating the hysteria. I think the general tendency is to be too dilatory in changing the treatment.

I have also to remark an instructive clause in this girl's history. She is a native of Edinburgh, or at least was long resident there, and always enjoyed very robust health and high spirits, and never felt tired. But on her coming to London, eight months ago, this high health almost immediately began to fade, her nervous powers declined, so that she never felt up to a good day's work, and she fell into a state of perverted nervous sensibility of which you see the phenomena. I cannot help attributing her illness to the depressing influences of the climate of London on a person used to the stern bracing air of the East of Scotland.

[This girl regained her voice and general health, and left the hospital November 27th to take an opportunity which offered itself of returning to Edinburgh.]

Another case of hysterical aphonia came in last week. Sarah L., aged twenty-eight, lost her husband two years ago after a pulmonary consumption, which had laid him up for five years, and during which she had nursed him assiduously. She says her health has never been strong since, though she cannot give a name to her illnesses: she has been frequently prostrated by a

feeling of excessive weakness, but has had no definite classifiable ailment. So she continued till a fortnight ago, when she quite lost her voice, and then was taken with a severe cough, which "quite tore her chest to pieces." A few days before we saw her here she began to spit up blood, but I could not make out from her account that the blood came up with the cough. When I first examined her she complained of exaggerated pains all over, and her whispering attempts at conversation brought on a paroxysm of a violent spasmodic character, like whooping-cough without the whoop, but it resulted in no expectoration. She said she was sure she was going into a consumption, but percussion and auscultation of the thorax gave no evidence of any pulmonary or cardiac lesion. The next day she showed me a quantity of slimy blood in a porringer, which she had spat during the night and day. Blood it was truly, but yet it presented to the eye not exactly the aspect of that which might come from the lungs. It was neither scarlet nor frothy, like that so common in early tuberculosis, not did it consist of streaks in the mucus, like that of a more advanced stage, but it was incorporated with and soaked into the mucus, more like what you have in congestive pneumonia, now she certainly had not congestive pneumonia, and therefore I believe it does not come from the pulmonary tissue at all. This view is confirmed by the nurse, who says the patient does not cough it up, but hawks it up very gently. My own impression is that it is drawn down into the fauces from the back of the nose or comes at lowest from the trachea.

What renders the case more complicated and puzzling is, that her breath is fetid and her tongue coated with a white fur, from some mercurial medicines which she had been taking before admission. It is very like the tongue of inflammatory fever. But then to balance this element of difficulty in the diagnosis, she has hysterical paralysis of the lower extremities, being really unable to stand, and stumbling forwards on the floor when I left her alone without support in the middle of the room. The form of paralysis is sufficiently special to mark its hysterical character,* and compensate for the other difficult points of diagnosis.

It seemed perhaps rash and cruel, when to a patient who thus

* See before, page 389.

exhibited the symptoms of hæmoptysis, cough, loss of voice, pain in the chest, quick pulse, and furred tongue, I straightway ordered valerian draughts and a cold shower-bath every morning. But I felt safe in my diagnosis from the characteristic appearance of the eyelids and the dilated pupils. She said she was sure that the shower-baths would kill her; but she survived the first, and after the second confessed it did her a great deal of good. She is improving rapidly, and seems now really desirous of being well, submitting without a murmur to the moral influence which I have desired the nurses to exercise, in giving her employment, and not allowing her to lie down and think, as she is prone to do.

This case is an instance of the enormous advantage over our forefathers which auscultation gives us. Without the stethoscope it would have been a most anxious thing, nay almost impossible for even the most shrewd to have pronounced the negative opinion that this blood did not come from the lungs, and that the cough was not produced by rapid tuberculosis. It is an instance also of the reward which follows bold and decided action in these cases.

PART V.—(*Clinical, St. Mary's, November 28th,* 1863.)

Sarah L. went on very well, having lost her cough and hæmoptysis, and recovering the use of her legs under the administration of a cold shower-bath twice a day, and valerian, till November 23rd. Then her monthly period began in the usual way, and according to established practice the ward-sister ordered the shower-bath to be discontinued. Sarah L. took to her bed next day, and began again coughing violently, and expectorating, really expectorating this time, a quantity of frothy bright blood with each cough. There was as much as half a pint spat up in twenty-four hours. Yet the catamenia continued to flow, though scantily. I found her on the 25th in bed, tortured with violent paroxysms of coughing, and throwing up blood each time. I took a slab of ice, and placing it on the sternum, directed her to hold it there with a piece of flannel. The paroxysmal cough and the hæmoptysis ceased forthwith,

and when I saw her next day, she said she had kept constantly applying the ice, and that it always stayed the cough immediately. The catamenia continued. I bade that on their ceasing she should resume the shower-baths. But this morning, when the nurse, finding the prescribed time for their resumption had arrived, ordered her to have one, she refused, and when remonstrated with, still persisted in her refusal, though acknowledging all the good they had done her. Our necessarily strict rules of discipline render her, therefore, no longer a patient of the hospital, I am sorry to say, for I was very anxious to see the result of this curious and instructive case.

Several examinations which I and others made of her chest convince me that there was no lesion of the pulmonary tissue, such as usually gives birth to hæmoptysis. I own at first, and even at the time of my last lecture to you, I was suspicious that the blood was produced by a voluntary effort, such as may be exerted on the back of the fauces, or nasal fossæ; but observation of this last attack completely exculpates the patient in that respect. No voluntary effort could cause the blood to be exuded in such quantities into the trachea, for auscultation showed it to be in the trachea, not the bronchi. Then its occurrence at the menstrual period induces me to range it in that curious and, fortunately, rare class of cases, where the monthly hæmorrhagic nisus of the female sex, instead of confining itself according to the convenient arrangement of nature to the womb, an out-of-the-way and secret part, is exhibited in other more conspicuous and troublesome places.

Some of my third-year hearers may, perhaps, remember a remarkable instance of this misplaced discharge in a young woman who was in the hospital two years and half ago. She menstruated by the usual path, but at the same time had an exudation of blood in minute puncta, from the skin of the arms or forehead, or legs or chest.* I called it then a case of "bloody sweat," for in looking at her pale face and gore-dabbled brow, a memory of Gethsemane could not fail to offer itself, and I hope such memories are not irreverent. She

* Full details of this case and the literature of the subject are published in the 'Lancet' of March 2, 1861.

also, like our present patient, was hysterical, was suspected of imposition, and carefully watched, but no deception could be detected.

When that case of catamenial bloody sweat was admitted, I did not know at all how to treat it, but I found experimentally that free leeching the spots where tenderness gave notice of threatened hæmorrhage, not only prevented the immediately imminent hæmorrhage, but gradually lessened the tendency to it. She had seventy leeches applied in this way, and lost besides by venesection twenty-four ounces of blood; yet she gained strength, and became less hysterical, and went out nearly well after four months. She had a recurrence last year, when I saw her once, and ordered her some leeches as an out-patient. And again a few weeks ago you saw her in the ward, having come to apply to me for some leeches to relieve a slight recurrence in the cheek of her old complaint. She stated that she had been previously free of it for many months.

This last-named case shows that in misplaced catamenia with hysteria leeches will cure the hæmorrhage, without damaging the mental state; and it was my intention to have tried an analogous method of treatment in Sarah L.'s case, but her abrupt departure has defeated my design.

In all my lectures on hysteria, the conclusions to which I have endeavoured to lead you by aid of the patients under your eyes are—

1st.—That it is a disease (a word which I always use as synonymous with deficiency of life) of the mind and of the body also;—

2ndly.—That in some cases the mental, in others the corporeal phenomena predominate;—

3rdly.—That the predominance of one or other must be our guide, whether moral or physical agents are most required in the treatment;—

4thly.—That the aim of our treatment of the mind must be the teaching our patients to exert their will;—

5thly.—That the organ which aids us most in our treatment of the body is the stomach, and on the proper regulation of this viscus the success of that part of our practice will depend.

LECTURE XXXIII.

SPINAL PARALYSIS.

Case of paralysis caused by meningitis of the spinal cord—Action of iodide of potassium.

(*Clinical, St. Mary's, June 27th*, 1863.)

Meningitis of the spinal canal, about which I am going to lecture to-day, does not present the interest of frequency. It may perhaps be many years before you have a case of it to treat, perhaps you may never see another. But the fact is, I have not to-day any more instructive cases to lecture about, and I will try and extract for you from it what wisdom I can.

William T., a pale-faced, sandy-haired, and delicate-looking shop-boy of seventeen, has been under your observation since April 10th. He stated that his father and mother were alive and healthy, and that he himself had always been well till Wednesday in Passion Week (April 1st), when he had to carry a heavy load on his shoulders; while thus employed, his foot slipped and he fell down against a wall, but did not knock his back or bruise himself. At about two o'clock the following afternoon pain came on suddenly in the lower part of the loins. He however went on with his work that day; he had a holiday the next, being Good Friday, and worked again on Easter Eve. But on Easter Sunday the pain was so bad that he took to his bed, and lay there till the Thursday after, when he got up and sought medical advice, as the pains in the back were so bad that he could not sleep at all. On the Saturday, April 11th, he walked to the hospital, and was sent to bed. But though he walked, he said his left leg was very painful and numb. He

complained of great thirst, the skin was hot, the pulse quick and sharp, and the tongue thickly coated with a yellow fur.

At first he was treated with chloroform fomentations to the loins, as for rheumatic lumbago; but two days after admission a more accurate examination detected the seat of the pain to be in the situation of the last lumbar vertebra at its junction with the sacrum. The pain was much increased by pressure and by percussion. Both legs then appeared to be growing numb, and there was some difficulty in moving them. But the sphincters were as yet unaffected, and he retained his urine and fæces naturally.

These symptoms led to the diagnosis of meningitis of the spinal cord. He was cupped to eight ounces at the painful spot on that and the following day, and a continuous chloroform poultice was kept on the sacrum.

The paralysis of the legs increased, and sensation became very deficient, so that he scarcely felt the hot water bottle at his feet. He was then (on the 15th) ordered ten grains of iodide of potassium every three hours. On the 18th there was less inflammatory fever, and the tongue was cleaner. But the sphincter of the bladder had become paralysed, and the urine trickled away involuntarily. A catheter was then passed and the bladder found to be full, being incapable of spontaneously emptying itself. The urine drawn off was alkaline, and contained a small quantity of floating pus globules. Then he entirely lost command over the sphincter ani, as well as over the bladder, and lost also all sensation of the passage of either fluid or solid excrement. The urine was drawn off three times a day, and constantly contained a large quantity of ropy pus, sometimes quite obstructing the catheter. The iodide of potassium was continued in the same doses, with no addition except that for two days he had with it a few drops of tincture of cantharides, which was left off on the bladder being inflamed, and occasionally a little tincture of opium, to make the fæces more solid and less troublesome to those who cleaned his bed.

The paralysis was at its worst about the 30th of April, after which it began to mend, first in the legs, and afterwards in the sphincter ani, and then in the sphincter vesicæ. The amendment in the two latter seemed to be considerably aided by the appli-

cation of blisters on the sacrum and above the pubes. The patient can now move his legs about freely in every direction as he lies or sits on the bed, and can voluntarily retain his fæces and urine. He can prevent himself from making water for an hour together. He is, however, excessively emaciated and weak and cannot of course walk about much. The introduction of a catheter into the bladder shows that it spontaneously empties itself, so that the muscular action has completely returned; but still there is a certain amount of floating pus in it, and it is seldom decidedly acid. He is taking decoction of uva ursi and cod-liver oil, and improving daily in every respect.

[He left the hospital fat and well at the beginning of August, without any purulent secretion from the bladder remaining.]

I take this case to have been one of meningitis of the spinal cord, that is to say, inflammation of the white fibrous coverings, and not of the nervous tissue itself. Instances of disease of this part are rare, and therefore one cannot of course be very pedantically positive in reasons for a diagnosis. My principal reason was the presence of local pain; for in disease of the spinal cord itself there is no pain, as some of you may recollect to have seen in the case of a young woman who died with a scrofulous tumor in its lower part, last winter session. The cause of her death was chorea, but there was no paralysis or local pain. Local pain is also absent in cases where hæmorrhagic clots, tumors, or inflammatory softening occupy the central parts of the cerebral mass; whilst it is on the other hand almost always present when the dura or pia mater are affected.

My clinical clerk, Mr. Philps, has shrewdly suggested another reason for the diagnosis, namely, that the pain was situated very low down, to wit in the lowest lumbar vertebra. He says that as the cord has given off all its nerves and ended at the level of the first lumbar vertebra, any pain referred to a situation below that must be in the envelopes which continue to surround the bundles of nerves, rather than in the cord itself. And I think his reasoning very good.

As to the origin of the disease in this case there is not much to help conjecture. Possibly a rupture of some fibres of the psoas muscle by the strain in stumbling under a heavy burden may have started an inflammation in the interior of the pelvis,

which affected secondarily the coverings of the sacro-spinal plexus, and so spread upwards. Possibly there may be some scattered tubercles in the meninges of the cord or its theca, just in sufficient numbers to excite a curable inflammation, but not an incurable one. We have not enough data on which to found an anatomical diagnosis.

But we have plenty of data for the foundation of a therapeutical diagnosis. There was paralysis of the lower nerves of the spinal cord, probably from inflammation of its meningeal coverings. And on this was based the treatment by iodide of potassium. You may know from observations of its use in tendinous and thecal rheumatism, in aponeurotic headaches, in chronic syphilis, in periostitis, in inflammation of the eye, in hard enlargements of the glands by disease of their connective tissue, in some of the consequences of gonorrhœa, &c., how this drug causes a renewal of healthy life in white fibrous tissue, without any evacuation or destructive action, as is shown by the patient's increase in weight during its appropriate employment. By its action on that tissue I explain its use in such cases as these. I employed it once as the only drug in a case of meningitis of the brain in a young man with the best results, and shall be disposed to trust to it with equal confidence in future.

LECTURE XXXIV.

SCIATICA.

Anatomical pathology of the disease—Case of rheumatic sciatica —Rokitansky's description of the morbid anatomy of sciatica —The disease a local one—Therefore requiring local remedies—Case of gouty sciatica—Relief from cupping—Peripheral pain sometimes more lasting than central disease—Sciatic paralysis of bladder—Case of anæmic sciatica—Local treatment first requisite—Use of iodide of potassium —And of quinine—Other forms of sciatica—Other remedies besides those named—Deductions and reflections.

(*Clinical, St. Mary's, January 26th,* 1861.)

THREE of my patients now under view in the wards are indexed as cases of "sciatica." The term, though Latin, is not a technically pathological one; for it no more defines a morbid process than the vulgar English "head-ache" or "stomach-ache." Like those words, it points out the anatomical locality of the symptom, and is applied to pains in the great sciatic nerve, whatever their nature or cause may be.

It will better impress upon your minds several important points in its pathology and treatment, if I recall to you a few of the anatomical relations of the part affected. The sciatic is the largest nerve in the body;—and on that score even slight interference with it may be expected to be severely felt. It is formed by a union of the sacral nerves; which, inside the pelvis, (forming the sacral plexus,) are covered on the left side by the rectum, and on the right side are in close proximity to the cæcum;—hence, it is very liable to be influenced by the condi-

tion of either of these portions of the intestinal canal separately. It is covered by a strong fibrous sheath;—and may of course be expected to experience morbid states which attack such membranes. It supplies motion as well as sensation to the lower limb;—and therefore loss of muscular power often follows its loss of vitality. Inside the pelvis, branches are sent from the sacral plexus to the bladder and other pelvic viscera;—so you will not be surprised to find in sciatica occasional paralysis of the bladder. After it passes beyond the border of the pyriformis muscle, it lies nearer the surface than any great nerve, and it goes straight from one of the warmest berths in the body to one of the coldest;—and that it is soon affected by changes of temperature is readily to be understood.

The first case which I shall mention is a good instance of the last-named fact. The affection is strictly local and pretty recent, and is clearly traceable to a local change of temperature acting on this part of the body alone.

Case 1.—Henry T., aged twenty-eight, a horse-patrol, of temperate and regular habits, had been quite well up to the second week in December, when he got wet in the saddle several nights running, and his buttocks and thighs were much chilled. This was followed by cold and shivering, but by no particular pains in the limbs. Suddenly, while grooming his horse, he was seized with a twinge in the hip, which made him walk lame and prevented his sitting on horseback, but did not quite lay him up. He continued with the aid of a stick to go through his beat a-foot instead of riding. One day, and one day only, before Christmas, the pain quite went away; but, with that exception, it became worse and worse. Since December 29th he had been laid up unable to stand, so bad was the pain; and he had had croton oil rubbed in externally, mustard poultices, and blisters, without the least relief. The tongue, pulse, and action of the bowels, were reported natural, the urine clear. The situation of the pain, as pointed out by one finger, was the exit of the sciatic nerve, and pressure on that spot much increased it. He told us, also, of a pain deep down in the pelvis, as if it lay at the back of the groin.

There is here a purely local disease, asking for local remedies. The morbid anatomy of it I cannot describe from any observa-

tion of my own; none of us possibly ever have seen, or ever will see, the necropsy of a person who dies during sciatica; it is not itself deadly, nor does it accompany deadly diseases. But Professor Rokitansky describes the sheath of the nerve as filled with a yellow gelatinous fluid, and as having its blood-vessels injected in sciatica. This is just what you find in the rheumatic inflammations of other fibrous parts, and what a general knowledge of pathology would teach us to expect; and, therefore, I fully believe it is the unseen state in this and similar cases. It is a local disease asking for local remedies. You will say, it has been so treated in this case, and it has not got well. True; but the remedies were, for all that, of the right sort; perhaps not quite powerful enough, and, moreover, not quite local enough. What does that pain deep-seated in the pelvis mean? It shows that the sacral plexus is affected, as well as the trunk of the nerve; that the remedies must be applied to that part to have their full effect. Such, I take it, is its meaning. Now, applications to the skin of the hip and thigh are a long way off the sacral plexus, and you would not get much nearer by placing them on the groin. But you can get close to, indeed quite on, the seat of action, by calling to mind how the plexus is overlaid by the rectum. His former treatment, mustard poultices, blisters, and croton oil, would be rather difficult to apply to that part certainly; but you can use an allied remedy, turpentine; and you can introduce it to the pelvis either by enema or by the mouth. The former method is the most direct; but I have chosen the latter in this case, for the mutual convenience of nurse and patient. His card records the following:—

Jan. 14th.—℞ *Olei Terebinthinæ, olei ricini, mist. acaciæ, āā* ℥*ss; mist. camphoræ* ℥*j. M. Fiat haustus mané sumendus.*

Jan. 16th. *Repetatur.* 19th. *Rep.* 21st. *Rep.* 24th. *Rep.* So that five doses of turpentine in all have been taken. On the 16th the pain in the hip was much relieved, but he had a little strangury during the action of the turpentine. On the 19th he said he felt better after each dose, though the pain came back again. The strangury was much less than at the first dose. On the 23rd, the pain was not felt during the day "a third as bad as it was." He could cross one leg over the other in sitting, and could walk without pain. But you will

have seen that he still walked lame, and spoke of a kind of numbness running down the thigh. This is a slight paralysis, very usual in sciatica, arising from the pressure of the swollen sheath upon the nerve. He said the deep-seated pain in the pelvis was gone. You will find the treatment here ordered the most powerful to cure the local condition of the part affected in sciatica.

To-day (the 26th) he walks quite easily. But, unfortunately, the turpentine, not having sufficient employment in doing good, has taken to doing mischief, and has brought on strangury again. He has had two grains of opium as a suppository, which has relieved it to a certain extent; and, instead of continuing the turpentine, I have ordered him to be cupped to four ounces on the hip.

Case 2.—Another patient in the same ward, Francis B., aged fifty-three, has no occupation now, but he tells us that formerly he did a business of £1000 a year, and enjoyed a famous constitution. Wealth and health were lost through self-indulgence in eating and drinking. He had gout thrice in one foot, and once in both feet, twenty years ago. Poverty made him temperate, but two years ago he had some money left him, and "drank it out," being only stopped by a severe attack of bleeding at the nose. Since then he has not exceeded, but still had a twinge of gout six months ago. After this he was quite well till six weeks ago; at which period, after having felt for three days pains flying about him, he was attacked, whilst sitting before the fire, with a stabbing agony in the back and left hip, so bad that he was obliged to go to bed. It has lasted ever since, and he has generally kept his bed; as, though he can hobble along without actual suffering, he is in constant fear of a twinge. All through this last illness there has been a difficulty in voiding urine, and the bowels have been costive. He has been under medical treatment all the time, and has taken bark and quinine in large quantities, and has had blisters on, without being at all relieved.

On admisson, the tongue and pulse were natural. By manual examination the chief seat of pain was found to be a spot midway between the great trochanter and the tuberosity of the ischium; and in this part there was much tenderness on pres-

sure, and the patient had great dread of its being touched. There was pain also skirting along the outside of the fibula, but not in any intermediate place.

In this case you have seen a different cause for sciatica—namely, gout. But whatever the cause, the local condition of the nerve is probably much the same, and is better for local treatment in all cases—indeed it is rarely cured without local treatment. The remedies given here have been pretty active; the patient came here on the 11th, and between that date and the 26th he has had five half-ounce doses of turpentine, and has been cupped twice to six ounces. For four days he was allowed, as an experiment, to have every night fifteen grains of Dover's powder, which I expected the turpentine to carry off safely by purgation next morning. It did not make him sleep, or appreciably relieve the pain, so it was left off; for, as a rule, I do not like opiates in sciatica. He had less discomfort on the night after it was left off.

On the 18th he said he had experienced great relief after the second cupping. Take a hint from this—your second cupping will often confer much more marked benefit than the first.

"He felt pain in the lower part of the leg, but not in the hip unless it were touched," says the case-book. You will observe that where there is pain in the periphery of a nerve, arising from disease in its trunk, this peripheral pain will often last longer than that which is it at the real seat of injury. Take care to retain this fact in your memory, as it will often prevent you throwing away uselessly on the branches those remedies which should be applied to the trunk.

On admission, the patient accused the bladder of some want of power. I have seen this before in sciatica; and I believe it arises from the vesical branch of the sacral plexus being affected, and therefore shows that the morbid condition has penetrated into the interior of the pelvis. If it really arise from that cause, and not from any old stricture, you need not be afraid of causing strangury by turpentine. You will have seen in this case the drug doing no harm, on the contrary, relieving the symptom which arose from a torpid condition of the bladder.

On the 23rd, he bore pressure on the sciatic nerve and

walked and moved the limb without fear, though with a certain loss of power. He had remarked several times, that though the pain was relieved after each cupping and dose of turpentine, yet it returned before the next. The cause of the disease, the gouty crasis, remains, and must be treated, or else he will have the sciatica back again. I have therefore prescribed—

℞ *Vini colchici* ℥*xx, potassi iodidi gr. iv, mist. camphoræ* ℥*j. M. Fiat haustus ter die sumendus.*

Case 3.—Sarah B., aged nineteen, maid-of-all-work, pale and greasy-faced, with cheeks and shoulders covered with black-heads (*acne*), was admitted January 11th. She has had occasional pain in her hip three years. It came on first when she was out of place, and had frequently got wet in her feet. She has often felt pains flying about her limbs, but has never been laid up with any distinct attack of rheumatism in her hands or feet. She often coughs, has been always pale, subject to leucorrhœa, and to pain in the epigastrium at night and after food. Her bowels are costive, and her appetite bad. She became lame from sciatica a few days before Christmas, and took to her bed during the last few days of the year, because the pain got so much worse. Although an out-patient at the hospital, she does not appear to have attended regularly; so that Dr. Sieveking, under whose care she was, sent for her to come in. On admission, her tongue was clean; the pulse was 92, and weak; the urine pale. The catamenia were stated to be always regular, except for three months, when she was first ill, three years ago. The seat of the pain was clearly pointed out by the finger to the sciatic nerve, and not the hip-joint. The heart and lungs seemed quite sound.

Here is a cause for sciatica the very converse of the last; that was from eating and drinking too much, this is from eating and drinking too little. Indeed in a further page of the report you read a statement of the girl's own, that "the pain sometimes entirely goes away, especially after a good dinner; but always comes back again, especially at night." But though scanty diet has been the cause of her illness, yet full diet alone would not restore health. In point of fact, however much she may swallow, she cannot really eat, that is digest, enough. This is shown by the want of appetite and the peculiar dyspepsia; which

is described as causing weight at the epigastrium, and inability to lie on the left side.

The local disease required treatment first; so she was cupped once to four ounces and was purged with turpentine; and she took four grains of iodide of potassium three times a day.

Five days afterwards it is registered that "the pain in the thigh is less than it was, and she is improved in every way."

On the 23rd, she expressed herself as still better, and was walking about the ward. She was put on quinine and iodide of potassium.

The last-named drug I intend to act locally when I give it in sciatica. I want it to promote absorption of the yellow gelatinous fluid which is effused in the sheath of the nerve, and which keeps up lameness by pressing upon it, just as you may benumb your finger by pressing the ulnar nerve. Iodide of potassium has a very peculiar restorative action on the vitality of the white fibrous tissues, whether they form tendons, sheaths of nerves, or periosteum; as you may see daily in those parts when they have been injured by the poison of syphilis.

I do not suppose there is any syphilitic taint in this case to be benefited by the iodide. Nor, though I give her quinine, do I think that the disease is of malarious origin.

Yet syphilis and malaria do sometimes produce sciatica. The syphilitic form is of the same nature as periosteal nodes, but it is identical in local effects with rheumatic, gouty, or anæmic sciatica. The malarious form is purely neuralgic, and I do not think it can ever be accompanied by effusion. It may be distinguished by its complete intermittence, and, as far as my experience goes, is comparatively rare. The patients usually have some other consequence of the ague-poison, which will help you to a diagnosis.

Sometimes there is a dull kind of pain running down the course of the sciatic nerve in persons with sluggish, costive bowels, which, unlike the forms I have been describing, is not worse at night, but neither in the day is it attended by paroxysms of agony, and it is not made worse by local pressure. This kind of sciatica depends, not on the state of the nerve or its sheath, but on an unhealthy sluggish condition of the lower bowels. When on the right side, it is due probably to accumulation of

fæces in the cæcum; when on the left (which is the most usual case), to piles in the rectum, and the consequently congested state of the blood-vessels. It is also not made worse by exercise; indeed, I think it gets well sooner when the patient is obliged to move about. And for this reason you do not see examples of it in the wards, for it is better treated in the out-patient department; whereas in the cases with which I have been illustrating the subject absolute rest is essential.

I do not like in clinical lectures to speak of the treatment of forms of disease not at the time under your notice, and, therefore, I will not say more about malarious, syphilitic, and costive sciatica. But I think it will be useful, in reference to the three cases you have been watching, to notice a few remedies which might have been given without glaring malpraxis, but yet which I do not think the best under the circumstances. In the first place, sedatives might have been considered desirable; and you will find in books a long list, commencing with opium, of those which have been administered in sciatica. The very length of the list shows how people have been disappointed with the action of one after another; and my own experience is, that the benefit from them is temporary, fallacious, and obstructive to the final cure. The only one thoroughly unobjectionable is the external application of chloroform. Blisters and acupuncture are remedies of similar intention to those which I have prescribed; not quite so powerful, but equally rational and proper. Plasters are of no use during the acute stage, but when the patient is getting about again, they are a defence against the cold. Let them be spread upon stout soft leather; for it is the leather, not the "*emplastrum*," that does good, and the kind that will stick tightest answers best. Of electricity and baths I have no favourable experience to tell. I have never seen them of use to the local disease after the failure of those remedies which I mention; though I daresay mild cases may be relieved by them, as also by numerous other expedients, which I need not detain you by naming.

I will tell you why I do not name them. When you have once established in your own minds that one particular methodus medendi is the most effectual for a particular class of cases, you should not continue to retain in your armoury, to be used for

that same purpose, the weapons which it has superseded. It will merely burden your memory and confuse your judgment; and it throws in your own path a temptation to wavering. Let new weapons be tried by all means, if to the eye of reason they promise well; but let all which have once fairly proved themselves failures be rejected.

At the same time be not too ready to adopt as fixtures any pet plans of treatment. Let them rule for the time, but let them be prepared to make way for better when they fail to do all that is justly asked of them. Then let their conquerors occupy the same post under the same conditions. When you have a new remedy you want to try, select some cases in which your already established treatment has failed, and when you have found it succeed there several times, you may fairly depose the old monarch in favour of the new. Thus will our art advance.

The most important moral which I would draw from our experience of sciatica is this: to apply to local diseases the needful destructive remedies as locally as possible. Do not call upon the whole body to make sacrifices for a single member, if you can by any means avoid such sacrifices.

This rule applied to the administration of destructives is directly antithetical to that which should guide us in the use of constructive agents, where we should prefer in every instance constitutional to local action. Remember that in the first case we are doing harm for the sake of future good; in the other we are doing general good for the sake of particular good.

LECTURE XXXV.

ALBUMINURIA.

Indications afforded by the presence of albumen in urine, and prognosis derived therefrom—Treatment based, not on anatomical division of forms of degeneration in the kidney, and not on the quantity of albumen, but on the circumstances accompanying its presence—Adjuvantia, viz., iron, digitalis, strychnia—Lædentia, viz., mercury, alcohol—When each are justifiable—Treatment of dropsy by baths, jalap, cream of tartar, elaterium, and acupuncture—Sloughs of skin, how treated.

The presence of albumen in the urine (or albuminuria) is a notice whereby we learn the partial death of one of the most valuable structures in the body. It shows the inefficient state of those organs through which the urea is separated from the blood—the urea, which is a measure of the amount of destructive metamorphosis, a measure of the amount of one of the most essential parts of vital renewal. The knowledge of this partial death is justly regarded as a most important piece of information for us to gain. And you see it is easily and quickly gained by the well-known test of boiling and nitric acid.

Remark first—*it is as a notice that the presence of albumen in the urine is important.* The quantity of albumen lost makes little difference. The patient would be in a sad way indeed if such a small loss were of great consequence to him. It is the mere fact of its presence at all that affects our prognosis so much. Hence not the proportion of albumen made visible by our tests, but the circumstances accompanying the discovery, make that prognosis favourable or the contrary.

One very important circumstance is the permanence of the symptom. A single experiment should never make you a gloomy prophet; for albuminuria is sometimes only of a transitory character; and though that single occurrence may lead you to be suspicious and anxious about the future history of the patient's kidneys, yet it may be years and years before any harm happens.

Another thing that you should search for is blood. If there is a stain of it in the renal excretion, or if blood-discs are to be found by the microscope in the sediment after the specimen has stood quiet for half an hour, you will know that the disease has not yet lasted very long, and therefore is more likely to be transitory than if it were of old date. This observation is of great prognostic value after scarlatina. In patients recovering from that complaint the absence of blood from albuminous urine is a bad sign, as showing that the kidneys were probably unhealthy before the accident of the eruptive fever; while the presence of blood, as shown by a red or dusky or smoky tinge, is an encouraging one. If the urine *must* be albuminous, it had better be bloody, as far as prognosis is concerned.

The secretion of a great quantity of water in albuminuria is some evidence of the chronic character of the ailment, and is thus far unfavourable; but this phenomenon is so much varied by the daily habits of the patient, the state of the skin, bowels, &c., that it is difficult to give any strict rules of prognosis dependent thereon.

The leading fact for you to note in albuminous urine is the quantity of solid matter which is daily passed. The quantity of solid matter ($\frac{1}{3}$ths of which is urea) is practically a direct measure of the vitality of the secreting portion of the gland from whence it comes; and you know that if there is a fair average amount of that substance made in the twenty-four hours, there is a sufficiency of healthy kidney remaining, however abnormal the remainder may be.

Hence you derive the following rules:—

1. The prognosis is best, if the specific gravity is as high as that of healthy urine, and the quantity natural;—

2. It is next best, if the quantity is diminished without diminution of the specific gravity;—

3. Next, if the specific gravity is diminished without diminution of the quantity;—

4. Worst, if both specific gravity and quantity are diminished together.

In the course of lectures on systematic medicine, I describe as in duty bound the many shapes which degenerated kidneys assume, the "large yellow," the large and small "mottled," the "granular," the "cysted" large and small, the "hard," the "atrophied," and whatever other I can find represented by specimens in the museum, or sketched in my portfolio. I seldom conclude the subject without being asked whether these diverse forms are witnesses of diverse noxious agencies—whether some arise from one cause and some from another—whether some impede one function and some another—above all, whether special remedies are needed for each. I am forced in honesty to answer, to the best of my belief, No; and to say further that it is lucky it is so, for at present our means of diagnosis do not enable us to find out which form lies hid in the body of a sick man. The light has failed which it was hoped microscopic research of the renal casts might throw upon the matter, and it is only by a statistical observation as to which is most usual at particular periods of life that a rough guess can be made. We must not base our treatment on post-mortal anatomy, or we shall fail in our duty to our patient.

Upon observations of the same phenomena, which form the groundwork of our prognosis, should be grounded our therapeutics also. We need not, as a general rule, attend to the proportion of albumen contained in the specimen of urine examined; we must not augment our vigour because the coagulum forms a more than usually solid clot; nor must we consider it less necessary in a case where we can only obtain indications of the abnormal contents by a slight opalescence insoluble in nitric acid. And knowing that the greater or less amount of albumen present is rarely of practical importance, let us not waste our time and drugs by direct attempts to curb its evacuation. We may, for instance, wisely look upon the administration of astringents, such as gallic acid given with a view to stop the emission of albumen, as childish. We know that not the loss of albumen, but the state of constitution of

which that loss of albumen gives notice, is the real object to be attended to, and to be made the end of medication. One runs a great risk of being led off the true track by following by-ends.

What, then, is the essential nature of the state of constitution which leads to the presence of albumen? It is an imperfect growth, a lower vitalized state of that epithelial cell-tissue which separates the effete matters from the blood in the form of urea. A portion of these cells remain dead and sticking in the tubuli uriniferi, degenerate into fat mixed up with the fibrin derived from the blood, and thus replace a pervious gland by a solid and obstructive mass. Others, more luckily for the patient, are shed in the form of microscopic casts of the tubes. It is obvious that the intention of all successful treatment must be to replace them, not to prevent their being shed. The patient loses no more by getting rid of this useless tissue, than is lost by the separation of the sequestrum of a dead bone, and it is as bad policy to try and avoid one as the other. Indeed the shedding, in contra-distinction to the degeneration without shedding, is to be looked upon as a thing to be wished, and need raise no alarm, if other circumstances are in the patient's favour. In those cases which recover, the casts are often to be found in the urine after the urea has regained its normal proportion, and albumen can no longer be discovered in it.

The main object of our treatment should be to restore the blood to that sound vital condition which will supply a healthy growth of new epithelium equal to carry on the renal functions. This is best done by iron. Though I from habit order the tincture of the sesquichloride, I am nowise bigoted to that preparation, and if any reason can be given for another form of the metal, I do not object. The quantity of hydrochloric acid in the salt is not sufficient to allow one to attribute any calculable efficiency to it; the iron is the essential matter, and the more of it the patient can take the better.

Joined to iron, digitalis seems serviceable. I suppose it must act by restoring the balance of the circulation, and so making the supply of the vital fluid more regular and full. With degenerated kidneys there is often joined a like degeneration of the heart-muscle, so incipient as not to exhibit alone any symptom, yet possibly advanced enough to aggravate other existing evils.

It is in these cases of weak heart, especially with irregular pulse, that digitalis is so useful. From 25 to 50 minims of the pharmacopœial tincture daily is enough.

Strychnine is also a valuable tonic. It may possibly act by strengthening the muscular action of the heart. The doses should be small; $\frac{1}{20}$th of a grain three times a day is enough to begin upon; but with many patients, to whom the drug is especially serviceable, you may often increase it gradually to double that dose.*

There is no physical agent capable of doing so much harm in albuminuria as mercury. Its action as a destructive is much more rapid in this state of the system than in any other. You can almost see the increase of the anæmia under your very eyes. In advanced cases of renal degeneration, after one or two doses sometimes the gums will show how the tissues are melting away, though there is hardly vitality enough to exhibit an increase of normal metamorphosis.

Yet this poisonous reptile carries, like the fabled toad, a jewel in its head. Where the specific gravity of the urine, and a quantity at all approaching the normal, indicate a trustworthy amount of metamorphosis, you can use this metamorphosis with most powerful effect to remove the dropsies which are so common in albuminurias. You may save the patient's life by an agent whose full effect is poison to him.

But remember you are wielding a sledge-hammer. Visit your patient between each blow, and watch its action with extreme suspicion. Do not let the blows be too frequent—one in the twenty-four hours is quite enough. And do not wield it against such butterflies as swelled ankles and puffy eyelids, nor on any but urgent cases unless you have tried other means first.

I have not myself employed any forms of mercury besides the bichloride and the blue pill, but I have nothing to say against other preparations. I usually give them combined with digitalis, and sometimes with squill; that latter drug seems to increase the quantity of water and salts in the urine, which are serviceable as a vehicle for the urea of metamorphosis.

* It may be remarked that the safest form of strychnine is the hydrochlorate dissolved in a solution. The dose is the same as that of the alkaloid. It is safer made up in a draught than in a pill.

Next to mercury, I think alcohol has the most harmful power in albuminuria. Theoretically, we may suspect the injury to lie in further checking the already wanting metamorphosis of tissues. As a matter of fact, you will find under its use the skin become anasarcous, fluid accumulate in the serous sacs, soaking of the lungs producing dyspnœa and cough, poisoning of the brain with urœous blood, indicated by stupidity, giddiness, and coma, and, in short, all the evils you most dread in these cases. And alcohol has not, like mercury, a virtue which makes you overlook its felony. It seems to do nothing but harm in that deficiency of life which is the essence of the disease.

The only reason which can justify you in employing alcohol is, that the mind and nervous system of the patient happen to have been so long accustomed to its abuse, that when you have fairly tried to leave it off they sink from want of it.

In the last sentence I designedly used the word "*abuse*" instead of "*use*." You may readily distinguish those who have exceeded what is good for them in their employment of alcohol by this very weakness; they cannot bear to leave it off when on a bed of sickness—the bond-chains are so welded on to the nervous tissue, that in tearing them off you tear away life with them. Whereas a temperate user, who regulates the quantity of alcohol by its benefit to his digestion, and habitually lets the effect of each dose go quite off before he takes another, can bear without inconvenience to his nerves the removal of his accustomed indulgence. Be careful to ask your patients if they ever take alcoholics in the forenoon or between meals, as, if they do not, you need not in general be at all afraid of ordering them entirely to abstain.

A very important item in the treatment of albuminuria is warm clothing, especially woollen, next the body. It is not merely the warmth, but the electric action of the animal fabric which is beneficial to the skin. This is much more necessary to be insisted on than high temperature in the house, for in fact it is not a high but an even temperature that is required, and that is best secured through the normal retention of the heat by such sort of clothing.

Dropsy of an extent to require special treatment will scarcely ever come on when patients conform to the above treatment.

But you may find it already existing, as happens with the majority of albuminuriacs admitted to hospitals, so that practically you have as often to treat it as to prevent it.

The quantity of water excreted per urinam is defective, and hence much good is often done by simple confinement to the horizontal position in bed, and the administration of watery drinks in greater amount than the thirst demands. Frequent doses of weak broth attain that end very well. For water is a true restorative diuretic; it increases the amount of fluid secreted to a proportion greater than its own bulk, and it also increases the amount of urea and salts, thus directly increasing vitality. That nitre has the same power is rendered extremely probable by the experiments of Parkes and Dr. Shirks (quoted by the former*), and I therefore freely administer this neutral salt with water in all cases of dropsy. Under the use of these means the appetite improves, the lips become redder, and the pulse stronger, at the same time that the anasarcous swellings, and sometimes even ascites, diminish.

Warm baths, soured with hydrochloric acid, seem also useful. In two chronic cases (mild ones though) the excretion of albumen in the urine has disappeared, as well as the dropsy, under their employment. But I have never ordered them alone, the patients always having iron at the same time; so that I cannot speak very positively on the subject, except so far as to say that they certainly do no harm and probably do good.

While on the subject of baths I would remark that you must be careful not to let them be too hot. "The warmth of the body" is doubtless a wise rule, but then the warmth of the body in albuminuriacs is much below that of yours in health, and 98 deg. Fahrenheit often produces in them gasping, faintness, and exhaustion. They bear sudden changes of temperature in the direction of heat quite as ill as in the direction of cold, and 92 deg. is usually quite high enough for them.

Hot-air or vapour baths you sometimes see me order. Their advantage is that they can be used where the patient is so much swollen as to make getting up painful; but the effect is very stifling, even though the head is kept out, and is not more powerful in promoting the action of the skin than water baths.

* Parkes on the urine. 'On the urine in health,' chap. ii., sect. iv, 8.

It is only when these means have failed that I betake myself to mercury, with the fear and trembling above described.

An occasional active purge of jalap and cream of tartar will often be of service by setting up absorption of the extravasated fluid back into the veins. It is then thrown off by the kidneys. But you cannot trust to purgatives alone even to remove the dropsy, and on the albuminuria their influence is to be suspected. It is probably harmful, by increasing anæmia.

Of all purgatives the most weakening is elaterium. Its action is a peculiar one :—it causes an enormous flow of watery serum from the first mucous membrane that absorbs it :—if its vapour be drawn up into the nostrils for a short time, it is a powerful errhine, and is followed by a secretion of a pint or more of water from the Schneiderian membrane :—if it is dissolved in the œsophagus it causes such a deluge of the gastric fluids, that the stomach cannot retain them, and they are rejected by vomiting : —if it succeeds in passing the pylorus, a choleraic diarrhœa gushes forth, stripping the membrane of its epithelium just like its morbid prototype. It is therefore very uncertain in its operation, and I am sure I have seen patients not only frightened but really hurt by it. Moreover, I have never found benefit from its use in renal dropsy where jalap and bitartrate of potash had failed. If you are steadily purposed to give elaterium, use the form of enema, for you thus avoid the vomiting which is so apt to arise.

To puncture the anasarcous skin for the sake of relieving temporarily the distension is justifiable where that distension is causing more harm than a mere inconvenience, as for instance in the penis where it impedes the passage of urine, or in the scrotum and legs when it threatens to crack or to be frayed into sores. It is better to puncture it with a lancet to the depth of about a quarter of an inch than with a needle : the slits thus made discharge more freely and continuously, and are less likely to cause erysipelas than the smaller but more numerous needle pricks. I have scarcely ever found any evil result to follow this practice, and where the skin and areolar tissue have been very tense, I think they have by its means been often preserved from sloughing.

When in dropsy from either albuminuria or diseased heart

you are unfortunate enough to have a patient's skin slough, I should recommend you to employ a lotion found highly efficacious in our wards, made of equal parts of glycerine and of water saturated with chlorate of potash, and to keep the surface carefully covered from the air. The rapid restoration of vital action to the edges of the mortified tissue under the use of these means is very remarkable.

LECTURE XXXVI.

ALBUMINURIA.

Case of albuminuria with vomiting from ague cured—Case of albuminuria fatal from sudden pneumonia—Case of albuminuria fatal from epistaxis, and loss of blood and albumen —With comments on each.

(*Clinical, St. Mary's, October* 31*st*, 1863.)

Robert H., aged thirteen, was brought by his father to the hospital the first week in September. They had both landed three days before at Deal, out of a small schooner from Algeria. They had been four weeks and a half on the voyage, and during the whole of it had nothing to eat but potatoes; for the beef taken in store had got putrid. They slept in the life boat and frequently got very wet. The father was taken with quotidian ague when about half way over, and this lad had one paroxysm on the sea, and one after landing. For this ague he was brought in here, was treated with quinine, and had no return of it. It was observed, however, that his spleen was large, and he had some anasarca during this first residence in the wards. On the 25th of September he was discharged, and a week afterwards the anasarca returned in his legs, and the abdomen swelled. He was readmitted on October 9th, with anasarca of the whole lower part of the body. There was fluctuation in the peritoneum on percussion, and dulness of its lower portion on both sides. No enlargement of the spleen could be detected. The heart sounds were normal. The urine was of a dusky-brown colour and very albuminous.

On the 10th he was ordered this draught—

℞ *Tincturæ ferri sesquichloridi* ♏xv,
Potassæ nitratis gr. xv,
Misturæ camphoræ ℥j,
ter die,
and a hot-air bath every night.

Then occurred a symptom which is not uncommon in albuminuria, namely, vomiting. He felt constant nausea, and threw up the contents of the stomach several times daily. But in spite of this the anasarca disappeared, and the greater part of the fluid was absorbed from the peritoneal sac. But yet it struck me that the medicine might have had something to do with the sickness. So I left it off once and again, and both times the inconvenience ceased.

But I did not like foregoing the use of iron altogether, so I have since the 24th kept him on an ounce of mistura ferri three times a day. That he bears well and profits by. There are no signs of anasarca or ascites; and what is of more happy augury still, the albumen no longer is to be found in the urine, which is of normal colour and acidity, and 1015 in specific gravity. He remains in the hospital only because his father cannot for a few days return from the country to fetch him home.

The only peculiarity in this case is the vomiting, which however, as here, you may often by experiment trace to some unsuitable article in the medicine or food. Where you cannot find any such cause, and it continues obstinate, I have found alkaline effervescing draughts the most effectual remedy in albuminuriacs.

(*St. Mary's, October 26th,* 1863.)

I show you here the kidneys just taken from the body of a man who was yesterday brought into the hospital dead. He had been long a delicate man, but able to do a fair stroke of work. Two days before he had come as a casualty patient to the house-surgeon, who found him suffering from a certain

amount of pneumonia and catarrh, but was unable to admit him as an in-patient on account of the fulness of the wards. The next day he was worse, but still got up. On the morning he died, a man came and said he was very ill indeed, and obtained a promise of a bed for him. Before he got to it he had expired.

On examination, it was found that at most a quarter, I should have said not so much, of the right lung was imperfectly condensed with recent inflammation. The rest of the pulmonary tissue on that side, and the whole left lung was free from congestion, though wet. We began to wonder at the man's death from so insignificant a cause; for we are not used to have pneumonic patients die, without the pneumonia being either double, or at least occupying the whole of one lung. The heart too was quite uninjured. But the mystery was cleared up when we opened the abdomen, and found the kidneys I show you.

On tearing off the capsule you see that it adheres much closer than it should do, and that when it is gone, the surface of the organs is coarsely granular, instead of being smooth and shining. And a section exhibits the tubular and cortical structures much less distinct and different than natural. It looks as if some dull flesh-coloured or tawny stuff had been mixed up in both of them. Truly there is nothing here very conspicuous to students on the remoter benches of the theatre; but still, if you examine the parts in your own hands, you will see a good deal abnormal; and if you apply your minds you will see more still. You will see that there is much here which should not be, and yet that the kidneys are anything but increased in size. There must, therefore, be a serious loss or destruction of the important secreting structure of the organ. It is in point of fact not absolutely destroyed and removed, but it is partially devitalized into a less organized substance, which is utterly incapable of performing the duties of separating the urea from the blood, and of retaining the albumen in the blood-vessels. Hence the importance of lesions of the kidneys. And hence their importance is in direct proportion to the amount of secreting substance partially killed; not at all in proportion to their conspicuousness, and to the show they may make in the hands of an artist of morbid anatomy. An abscess, or a stone, or an

hydatid, may be more capable of artistic development, but they are by no means so important in their influence on health as a Bright's kidney so little apparent as to be easily passed over by a careless dissector.

I say the patient's rapid death was explained by the degeneration of his kidneys. But I do not by any means intend to imply that he died of the renal disease. On the contrary I bring this case forward especially to show you that it is not necessarily a fatal lesion. This man had lived with it probably for years, and gained his livelihood, and might have continued to live and gain his livelihood for an indefinite period. It was no recent or sudden increase of the long-standing visceral lesion which caused death, but the addition to it of a slight pneumonia, due to external causes, and very far from sufficient in itself to kill.

Both of these facts are highly important and suggestive; the first showing that a patient with degenerated kidneys and albuminuria may live, to a certain extent enjoy life, and be an useful member of society;—and the second, that if insignificant inflammations are added, they may very possibly prove rapidly fatal. Both facts should encourage us to spare no pains in preserving the health of our albuminuriacs, in the well-grounded hope that such pains will not be thrown away.

(*Clinical, St. Mary's, December 12th,* 1863.)

You have often heard me say that the amount of albumen contained in the urine of those affected by Bright's disease, is a matter of no practical moment; and I have corrected you when you have anticipated evil results to a patient, because the quantity exhibited by boiling and nitric acid chanced to be unusually large, or when you have slurred over the serious import of finding some slight traces of its presence in other instances. The fact is that the loss of albumen is easily replaced by food. Consider that 100 parts of meat contain from 15 to 20 parts of proteine, which are converted by digestion into a soluble form of albumen and pass directly into the blood; and consequently a daily loss of 10 grammes of albumen may, if the digestion is

fair, be replaced by three ounces of meat taken as food.* And as a matter of fact it usually is so replaced in our hospital patients, whose anæmia hardly every increases while in the wards.

Yet exceptional cases do occur, to one of which I have to call your attention to-day. Michael B., aged twenty-two, of a marked leucophlegmatic temperament, with pale blue eyes and yellow hair, a new patient on November 27th, stated that he had continued well and able to work as an ostler till four weeks before that date, when he was taken with vomiting, rigors, prostration, sore throat, and feverishness, and was forced to lay up in his miserable lodging house. He could not remember that he or anybody else had observed any eruption of the skin; yet I cannot but think that this feverish attack was scarlatina; for after four days' illness his face and legs began to swell, and anasarca continued up to the time of his coming under treatment, when the ankles, thighs, and abdominal parietes all pitted on pressure. At the same time that he became dropsical he began to suffer from pain in the loins, and he observed his urine to be frequently bloody—indeed more often bloody than not. He had suffered also from bleeding at the nose, and from vomiting. His respiration during the previous week had become short and difficult when he lay down in bed, so that he had to sit up, and snorted and snored a great deal in breathing, often also gasping for breath and sighing.

He was sent to bed and cupped to eight ounces on the loins. Sesquichloride of iron and tincture of digitalis were at the same time prescribed for him. This treatment was commenced immediately, and perhaps it was in consequence of it that we never saw the urine bloody, and that he had no more pain in the back. At all events such was the fact. But though there was no blood in it the urine contained an unusually enormous quantity of albumen, some specimens coagulating by heat nearly into a gelatinous mass. It was copious, light-coloured, and of a specific gravity always below 1·015. A drop of blood drawn from a needle prick of the finger was very pale, and placed under the microscope exhibited a deficient number of red discs in propor-

* Vogel on "Quantitative tests of albumen."

tion to the white globules, which latter were in comparative excess; and there was a considerably abnormal quantity of the fine granules in the serum. Many of the red discs had also fine granular specks in them as if degenerating, and quickly became crenated at the edges; they however formed into rolls in the natural fashion.

On the 28th he had some epistaxis, and several times threw up his food. In it there were some masses of mucus stained with blood, but whether these came from the stomach itself or from the nose could not be rightly determined.

By the 2nd of December the anasarca had quite disappeared. But the patient still breathed noisily, irregularly, and quickly, and gasped often like a person exhausted by loss of blood. The uvula was much relaxed, hanging down on the top of the glottis, and he coughed frequently and spoke in a whisper.

On the 4th he got up and moved about the ward a little, but was terribly exhausted by the exertion.

On the 5th the epistaxis had become more frequent, but was very small in quantity at a time. It little more than just stained the handkerchief, so pale was his blood. The enormous quantity of albumen lost by the kidneys was unabated, but he kept down more food. On account of the epistaxis I ordered him ℈j of gallic acid three times a day.

On the 6th I found him sinking. The countenance was excessively anxious, he was throwing his arms about in an agitated manner, gasping and sighing and complaining of pain all over, especially at the epigastrium. His tongue got dry and yellow, sordes collected on the teeth. But his mind was perfectly clear, and seems to have remained so till his death next day.

The case will of course be entered in the register as one of "dropsy," for with that disease he was received into the hospital; but yet he did not die of dropsy, either in the form of anasarca, hydrothorax, œdema pulmonum, effusion on the brain, or of any of the kinds of local congestion which conclude nearly every renal degeneration. Altogether, his end resembled that of one killed by long hæmorrhage. And in truth that may be said to have been the manner of it. For though latterly there was scarce any appearance of red blood in what he lost, yet what he lost was a part of the blood next in importance to

the red constituents. While at the same time the state of his stomach prevented the drain of albumen passing away from being replaced.

The case is very different from one of uræmic poisoning; it is the albuminuria, the loss of constructive material, and not the uræmia or retention of injurious material, which has killed the patient. There was none of the coma, or merciful overclouding of mental perception, which is the usual end in Bright's disease; but on the contrary extreme sensitiveness and agitation. I rejoice to think that such a termination is rare, for it is most painful to witness.

But for all that there is no doubt of the kidneys being extensively disorganized by some form of Bright's disease, and considering his age and the rapidity of the fatal result I should rather expect to find at the post-mortem examination you are going to see, a specimen of the large yellow smooth kidney.* How long he has had it none can tell; but it cannot have been long, for he was not injured by it till the scarlet fever (as I suppose) added its renal congestive influence to a pre-existent lesion.

I drew your attention to his leucophlegmatic crasis. Now, I am far from wishing you to put faith in all the vagaries built upon the doctrine of temperaments, as you know well from my systematic course on the practice of medicine. But yet I cannot shut my eyes to the fact, that there are certain forms of internal constitution, which, when they exist in a marked degree, do declare themselves by the external appearance and features, and that it is not entirely devoid of practical utility to take heed to these external features in regulating our treatment. Of these classes of constitutions one of the most important in respect of our practice is the leucophlegmatic. This is not the place or time to paint its peculiarities, which has been done so often by more graphic artists than I can hope to be. But all agree in contrasting it with the sanguine, and making, in short, these two temperaments antithetical to one

* It was rash to have dared so publicly to predict the form of degeneration, as the account of the dissection extracted from the "Post-mortem Record" shows. But I certainly did expect it, and it would be scarce honest to omit this sentence. It will at all events serve as a warning to clinical Lecturers not to be over-precise in their predictions.

another as to all their habitual phenomena. Now, it has always struck me, that the most important antithesis between them is one not usually brought forward, or at least only indirectly alluded to. I mean the relation which they bear to degenerative disease. In the sanguine temperament febrile disease is short, violent, and soon ended—cito mors venit, aut victoria læta—while degenerative disease is slow in progress, slightly marked in its phenomena, and little affected for better or for worse by remedies. In the leucophlegmatic temperament febrile disease is sluggish in progress, and imperfectly marked in its characters; while degenerative disease is extremely rapid, strongly marked, and either quickly fatal or freely amenable to remedies. It has been, as you have witnessed, rapidly fatal in the patient who is the text of this lecture; but I have often pointed it out to you checked with equal rapidity in more fortunate leucophlegmatic subjects. The observation, therefore, of the temperament, affects both our prognosis and our treatment.

[*Extract from Record of post examination* by Mr. Nayler, Curator to St. Mary's Hospital Museum.

Examination five days after death.—The kidneys were of small size, weighing respectively only one and a half and two ounces; they were studded with small cysts varying from a millet seed to a pea in diameter. They were pale and mottled externally and the capsule was readily detached. The lungs were very pale, but otherwise healthy and expansible. There was a good deal of blood-stained fluid in both pleura. (The blood-stain of the effused fluid, and some other phenomena not necessary to notice here, were probably caused by the length of time which was unavoidably allowed to elapse between the death and the autopsy.—T. K. C.)]

LECTURE XXXVII.

ASCITES.

PART I.—*Case of ascites from hepatic degeneration relapsing after tapping several times prevented from returning by the use of iron—Cause of the disease irremovable, yet the disease capable of cure—Pathology of ascites, and connection of the treatment with that pathology.*

PART II.—*Case of ascites from renal degeneration treated with iron and cured, though the albuminuria remains as before—Contrast of this with two cases of albuminuria from a remediable cause.*

PART I.—(*Clinical, St. Mary's, January* 16*th*, 1863.)

WILLIAM S., aged thirty-four, though he himself denies having lived an intemperate life, receives a different character from his brother, who says he has, at various periods, drank hard, and that even when not indulging in drunkenness, he has been in the habit of taking drams and beer between meals, and has kept himself in consequence in a low position in the social scale. The patient says that the only illness different from the present he has ever suffered from is rheumatism without swelling (chronic rheumatism or rheumatic gout), with which he was laid up twelve years ago. Two years ago his friends noticed that his complexion became jaundiced, and a year ago his abdomen swelled, for which he was in St. George's Hospital for five weeks, and went out somewhat relieved. He then drank green broom tea, and got much smaller in consequence. In August, however, he swelled again much larger than before, and at the end of

October was so large that his surgeon tapped him, and drew off a large quantity of fluid. Immediately however he swelled again bigger than ever, and on admission at St. Mary's November 18th, 1862, he was so ascitic that he could not stand; the breathing was much interfered with, and there was some anasarca of the legs. Tapping was accordingly again resorted to, and the quantity drawn away amounted to a few ounces over four gallons of clear fluid. At the same time, as the urine did not exceed about half a pint in the twenty-four hours, he was ordered the fellowing diuretics:—

℞ *Pil. hydrargyri,*
Scillæ pulveris,
Digitalis pulveris, āā gr. ij,
omni nocte et mane.
Infusi scoparii ℥*iij,*
Sps. ætheris nitrici ♏*xx,*
Ætheris chlorici ♏*x,*
quartâ quâque horâ.

But in six days he was quite as full of water again as ever, the abdomen was distended and painful, there was pain in taking food into the stomach, and it was often vomited up again. The urine too remained excessively scanty, depositing a copious orange-coloured precipitate. Elaterium was then given in addition, but with no beneficial effect either when administered in enema or by the mouth. He took it for ten days, and then was seen to be growing gradually larger and more incapable of motion. On December 10th you may see that all his former remedies were left off, and he was treated with the following draught three times a day:—

Tincturæ ferri sesquichloridi ♏xx,
Potassæ nitratis gr. xv,
Misturæ camphoræ ℥j.

He very soon began to improve. His appetite returned, and on the 25th he was able to get up, dress himself, and be about in the ward. His abdomen ceased to increase, indeed was an inch or so less in girth than before the change of medicine. But here it was stationary, so on the 31st I persuaded him to be

tapped again: nineteen pints of fluid were drawn off, when it ceased to flow, and some was apparently left in the peritoneum. Since then he has not again swelled, the bowels are regular and the appetite good. A fortnight after the tapping I find the clinical clerk has noted that he has got smaller in girth, and that he makes a pint of urine every night and a good deal during the day. This increase in the action of the kidneys has been gradual and did not immediately follow the last tapping. The patient is so impressed with the source of his disorder being traceable to alcoholic drinks, that he asked to have an egg daily in place of some ale which had been allowed him.

This case is a typical instance of the very common history of continual indulgence in depraved tastes. The constant presence of alcohol in the blood obstructs the necessary renewal of the fibrous capsule of the liver; contraction of the degenerated tissue ensues; the portal blood cannot pass through the viscus, to get rid of its effete particles or to bear the nutriment to the general circulation; the natural halitus of the peritoneal sac cannot be reabsorbed, and therefore accumulates to form an ascitic (or, as the Greek word means, an "ensacked") collection of serum. With this fluid is mixed also the albuminous serum and fibrous serum which exudes from the obstructed capillaries, and often these capillaries rupture and blood-corpuscles are found in the dropsical fluid.

Observe that in such cases as these, of which William S. is a strongly marked example, we have permanently fixed in the body a constant source of disease, a deformity of an important organ which is absolutely incapable of being replaced. The patient's liver is indubitably the cause of disease; if we could see it we should probably find it puckered up and scarred with hard contracting fibrous tissue, compressing and causing atrophy of the secreting structure. The majority of the hepatic cells are probably dead and converted into or filled with fat; and there is not room for new cells to grow. You can no more cure this, than you can cure the hard useless scar of a burn. It is not the disease. The disease is its consequences, the ascites, the anasarca, the diminished urinary secretion, the jaundice, the anæmia, the general discomfort under which the man labours. These are capable of very decided alleviation and often of cure.

You may look at the matter in this light—you have a patient whose body is deformed by a deficiency of liver; and as you are unable to give him back a liver, your aim must be to give him back those functions and those constituents of the body which the wanting organ has ceased to supply.

Remark what happened when the ascites was treated merely as a foreign body, as a thorn in the flesh to be plucked out. The quantity and weight of the fluid was a very painful burden to him; it entirely prevented his getting up, pressed on the stomach, produced vomiting, and seemed to the patient to leave no room for his meals. So there was a reason for its removal by tapping. But he immediately swelled again as large as ever, if not larger, on the first two applications of this process. And during this period the most powerful diuretics were vainly directed to increase the action of the kidneys. He himself felt strongly the failure, and declared that it should never be done again.

See, however, the effect of a three weeks' course of iron. He recovered strength so far as to remain sitting up in the ward a great part of the day; although the abdomen was as large as at first and much impeded motion, his muscular power enabled him to walk about; he gained flesh and some colour in his cheeks. Then was the time for tapping to be effectual, and with some trouble we persuaded him to retract his resolve and to submit again to what he justly enough urged had failed before. A considerable portion of the fluid was drawn off, and that amount which was removed has not again accumulated. He continues to get smaller in girth daily, and I hope in two or three weeks will be fit to leave the hospital.

The rationale of his improved condition is that the iron has restored the blood to its natural state, and thus supplied to the tissues that which is the final end of nearly all our manipulations with pharmacopœias and with nursing—namely, healthy nutriment. Without this treatment would be utterly useless; with it you see a rough treatment, namely, tapping, which had been unsuccessful once and again under previous circumstances, has now led to a happy result. Can we refuse to recognise this as true restoration, as real cure?

I am sorry to say it has been impossible entirely to keep his

old habitual poison from him. His spirits and nervous system generally got so low that it was necessary to allow him some gin daily. I am gradually diminishing his allowance, but I fear that when he gets out of our sight he will not be able to refrain. This of course must keep up, even if it does not increase, the degeneration of the hepatic tissues, and very slight accidents will readily bring back his dropsy. But so far as he is restorable, I think you have learnt the way to restore him.

The pathology of ascites I presume to be this—from obstruction of the liver, either temporary, of which you have one example in diseases of the heart, or permanent, as in degeneration of the hepatic tissue itself, or in compression of it by malignant tumors and the like, the passage of blood through it is hindered. This imperfectly vitalized blood insufficiently nourishes the vessels of the peritoneum, which consequently become inelastic and more ready, even than they should be, to part with their watery contents by exosmosis. At the same time the sluggish movement of the circulating fluid retards absorption, according to the well-known law of osmosis that in the case of a fluid set in motion, it is rapid in a direct ratio to that motion. Thus you have a double reason for the collection of the fluid, increased exosmosis from the blood and diminished endosmosis into it.

Rational treatment makes its chief aim the remedying, as far as remediable, such a state of things. It aims at restoring the strength and elasticity of the abdominal capillaries, at quickening and vitalizing the circulating blood, and thus renewing absorption to its normal activity. Normal activity! no slight thing is this we are speaking of: remember Dr. Richardson's experiment, by which he showed that fluid equal to at least one sixth of an animal's whole weight may be absorbed by the peritoneum in twelve hours:* and then consider that if a man's peritoneum can work at an equal rate (as I dare say it can) he will be able to dispose of at least a couple of gallons in the same time. So that if you can secure anything like a normal activity, you will soon do away with the ascites. Look upon it as a collection dependent on deficient vitality, not as an effu-

* See the previous Lecture on Hydrothorax, page 188.

sion dependent on some imaginary increased activity, and your treatment has a better chance of being rational and successful.

You will perhaps say that I was inconsistent in not trusting wholly to the iron, and that tapping ought to have been needless. But the fact is that, after long soaking with the ascitic fluid, the tissues are so saturated with it that they can return to their allegiance very slowly; and that the process is much hastened by removing the already collected serum. After the operation indeed you may give the iron with safe confidence, and your confidence will often be justified by a similar success to that which has attended this case.

PART II.—(*Clinical, St. Mary's, July 25th,* 1863.)

Dennis S. has been under your observation since June 12th. His age is sixty, and his employment that of a costermonger. I have no reason to doubt his statement that he has been always a sober and temperate man, but of course in his trade he has been a good deal exposed to inclement weather. Two years ago he was knocked down by a cart which passed over his loins; and during the illness which followed there was blood in his urine, and he was told by the physician who attended him that his kidneys were injured. After that he recovered health, and was well till last March, when he felt ill, and had cold skin and frequent shiverings. Soon his legs began to swell, and he had looseness of bowels, amounting sometimes to diarrhœa, after eating. He had also much cough, accompanied by thin mucous expectoration. In May the belly began to swell, and he lost his complexion, becoming of a pale faded-leaf colour.

When first I saw him in bed there was very considerable anasarca of the legs and ascites of the abdomen. But a couple of days' confinement to bed took away all the swelling of the lower extremities, leaving the ascites as the marked feature of the case. He measured forty inches round at the level of the navel, and the dulness on percussion caused by the fluid rose to within four inches of the mesian line. His urine was light-coloured, copious, of specific gravity from 1·010 to 1·015, and

very albuminous. There could be found in it sometimes granular, sometimes smooth casts of the tubes.

He was ordered ℿ*xx* of the tincture of the sesquichloride of iron four times a day, and had hot-air baths * at night.

On June 24th he measured thirty-eight inches round, and on the 26th thirty-seven inches.

I must remark that this measurement did not fairly represent the total diminution of fluid. For the abdomen was very resonant in places where it had previously been dull. In fact the vacant space left by the serum absorbed from the cavity of the peritoneum had been occupied by ilia and colon blown up with wind. Do not forget this in your estimate of the decrease of ascites—the intestinal walls, from being so long soaked in half-dead serum, lose their contractility and become distended with flatus; and thus the mere circumference does not show how much fluid is in the sac. You must correct your reckoning by the extent of dulness.

To replace the lost contractility I added $\frac{1}{20}$ of a grain of hydrochlorate of strychnia to each dose of iron. I find no drug so powerful as this to restore that deficient muscular force which is shown in flatus of the ilia. And while I am on the subject I would give you a hint that you have no need to be alarmed at a few twitches or cramps or at a slight stiffness of the jaw arising in patients who are taking it; the healthy muscles, the muscles you do not care to affect, are affected first in many cases; should this happen, all you have to do is to leave off the medicine for a day, and then begin it again in somewhat smaller doses. Do not leave it off altogether. I have never seen the slightest real harm done by strychnine, though it is a favourite remedy of mine. The notion of its "accumulating" in the body seems to be a fallacy derived from its occasionally acting more visibly as the patient nears health.

On June 26th his girth was 37 inches, and continued steadily to decrease; so that on July 15th (if not before) his belly was soft and lax, and of its natural size, as tested by the waistband of his former trousers, namely 32 inches. This represents the absorption of from three pints to half a gallon of serum.

* I have omitted to note when the baths were left off, but I think he had only five or six; as they were ordered in consequence of the anasarca.

He left the hospital yesterday in sufficiently good case to resume his trade, at least for the summer. For along with the anasarca and ascites, the cough, arising from a dropsical state of the pulmonary tissue, has got well. But the urine is still albuminous.

The last example of ascites upon which I gave a clinical lecture,* was one arising from degenerated liver. On William S.'s return from Walton six weeks after he left St. Mary's, he professed to be quite well, and to be convinced of the importance of temperance and iron to keep him so. I hope he is sincere.

The present example arises principally from degenerated kidneys, of which the diseased urine (albuminuria) affords evidence. Degeneration of these organs is usually due to exposure to weather, and is no proof at all of indulgence in alcohol. I am disposed fully to credit this man's statement that he has lived temperately.

Whether he has not also some slight degeneration of the hepatic substance, I cannot say. Very possibly he has, to judge by the ascites being such a marked feature in his case. For where the kidneys alone are at fault, anasarca is usually the prominent disease. But where some other organ fails also in a minor degree, such as the lungs, or the brain, or the liver for instance, then the joint influence of the two deficiencies appears in that quarter, in the shape of hydrothorax, or apoplexy, or (as here) of ascites.

Whatever the anatomical cause of the disease may be, it has been cured by iron, rest, good food, and strychnine. We may take for granted that his kidneys are as degenerated as ever; but he may be freed from disease, and may keep free from disease if he can get the wherewithal, and possibly attain his three score years and ten.

I want you to understand that what you have to treat is the ascites or the anasarca, as the case may be, and not the liver or the kidneys. Without the help of, or with the very imperfect help of, the liver and the kidneys, you have got to restore to the

* Viz., that of January 16, 1863, which begins this Lecture.

blood-vessels that defective elasticity, and to the blood that defective composition, for want of which the balance of endosmosis and exosmosis is reversed. I have already told you how iron does this.

In medicine you have often thus to cure the wound with the bullet still in, to relieve the burn with the fire still scorching it; for the bullet and the fire are parts of the body itself and cannot be extracted.

But it is not always so in cases of dropsy from albuminuria. You have two proofs to the contrary, which have been close neighbours to the ascitic patient in the same ward—two little boys, of six years old each, who were admitted with dropsy and albuminuria, the one (Michael K.) on July 3rd, and the other (Walter P.) on July 7th. In both of them not only has the dropsy got well, but the urine has ceased to be albuminous. Why? because it arose from a temporary not a permanent cause, from a congestion of the kidneys which can pass away. In one lad's case there was a clear account of scarlatina, for some of our house-surgeons had seen it; and, though the mother of the other denied that it had had any cutaneous eruption, yet she admitted that she was always out charing all day; and she brought her child here in such a filthy lousy plight that I do not think she could have looked much at its skin. There was an abscess also in one of the tonsils, and that combined with the dusky colour of the urine assured me that it was an instance of scarlatinous dropsy as well as the other, and encouraged me to give a favourable prognosis.

I said the "dusky colour of the urine" encouraged me. In fact, that showed me that at least a part of the obstruction of the renal tissue was due to blood, which may be expected to move on; and not, as in the old man's case, to a degenerate solid, which is an immovable impediment. You may remember the porter showing some of us a few weeks ago a kidney which he had taken from a patient, whose death he said arose from scarlatina. At all events, what he showed us presented in a marked degree the character of a scarlatinous kidney. The medullary cones were clear and pale towards their apices, indeed, paler than usual; but their bases had a dark blood-red halo of intense congestion, rendered more conspicuous by the natural

colour of the rest of the cortical substance. They looked like flesh-coloured fans, whose broad ends had been soaked in red wine lees. Such a state of congestion as this is perfectly curable; and without there should be any evidence to the contrary, any previous illness or the like, this is the state you should assume to exist in albuminuria after or during scarlatina. This is the state which you see me endeavour to prevent in scarlatina, by keeping the patients from cold chills (after the skin has been cooled by sponging), and by giving them a dose of castor-oil every morning. A treatment which will, indeed, as a rule, prevent scarlatinous dropsy, but of course will not cure it when once began.

Both of these children had the same treatment as the old man, hot-air baths and iron. Walter P., in whom the scarlatina was the most certain and most recent, and who seemed to experience some uncomfortable feeling in his back which he was too young to describe, had also four leeches and a poultice applied to the loins; the reason for which I have sufficiently pointed at by my sketch of the morbid anatomy of the disease. The happy result which has followed is that which usually rewards our efforts in cases of scarlatinous dropsy, if no previous degeration has existed.

LECTURE XXXVIII.

DIABETES.

Case of diabetes, with history of the treatment adopted—Arrest of function of construction in diabetes—Saccharine diet wasteful and harmful—Test of treatment is gain of flesh—Patients to be made into carnivorous animals—Sugar may be formed from flesh diet, or from hepatic tissue—But from dead, not live tissue—How far a very strict dietary should be enforced—Opium— Cinchona—Iron—Iodide of potassium—Gratification of thirst.

(*Clinical, St. Mary's, July* 19*th*, 1862.)

We know so little of the pathology of diabetes, that it is easy to fill a volume with the discussion of the subject; for you will observe that talk is always in an inverse quantity to practical knowlege. I shall cite only that which bears on a case before us.

William S., aged twenty-two, a thin whiskerless and young-looking farm labourer, has suffered for at least two years ailments of various kinds which are usually held by pathologists to be symptomatic of diabetes. He has been weak and unequal to labour, felt always thirsty and usually hungry, and daily voided large quantities of urine. For the last year he has been unable to work at all from general debility, and on that account came into St. Mary's May 31st, at which time the above-named symptoms were noted. The chest was examined and found healthy, the pulse was slow and regular, the bowels acted daily. The skin was naturally moist, and he stated that at night he often perspired; but the sleep was sound, except when he was awakened by the bladder getting full of urine. His weight

was 6 st. 11½ lbs. He remained in hospital five weeks, during which period the following variations in the urinary symptoms, with the changes in weight during the corresponding time, and the alterations in treatment to which I trace these changes, are noted in a table condensed from the case book.

During the first week the total quantity of urine passed was . . . . . fl℥ 680
Of the specific gravity before fermentation . . . 1·042
„ „ after fermentation . . . . 1·012
His weight had increased to 6 st. 12 lbs.

During the second week the total quantity of urine passed was . . . . . fl℥ 449
Of the specific gravity before fermentation from 1·039 to 1·040
His weight had decreased to 6 st. 11½ lbs.

During the third week the total quantity of urine passed was . . . . . fl℥ 472
Specific gravity . . . . . 1·039 to 1·041
His weight had increased to 6 st. 13 lbs.

During the fourth week the total quantity of urine passed was . . . . . fl℥ 452
Specific gravity . . . . . 1·040 to 1·042
His weight had increased to 6 st. 13½ lbs.

During the fifth week he lost half a pound in weight, and then left the hospital by his own desire.

During the first week he was treated with a grain of opium every night, a mutton chop for breakfast, in addition to the ordinary full diet, with three captain's biscuits in place of bread daily.

During the second week the opium was left off, and the treatment altered to eight grains of iodide of potassium three times a day, with a drachm of cod-oil; he was allowed but one captain's biscuit daily instead of bread, but as much meat as he could eat and as much milk as he could drink.

During the third week the captain's biscuit was changed to bran biscuit; but in point of fact he did not eat that substance, preferring to go without bread-stuffs altogether. No other change was made.

During the fourth week no change was made.

In the fifth week we tried to persuade him to eat Bouchardat's gluten bread toasted and buttered, but in vain.

The first practical point to be observed in the pathology of diabetes mellitus is the arrest in the function of construction.

That generally used material of nutrition, sugar, which ought to be assimilated as food and made available to the growth of the body, passes into the thoroughfare of the circulation and out again unaltered, and is ejected in the urine. And here I refer not only to the sugar which is taken as such into the mouth, but also to that which is formed out of starch by the action of the saliva. So that in one thoroughly diabetic the whole of the saccharine and amylaceous matters in the dietary are utterly wasted. Trying to feed him upon them would be just the same as feeding him upon nothing at all.

More than this, I think you are doing him harm. These useless articles of food, though they contribute nothing to his support, destroy his appetite, and so he does not eat the needful quantity of really nourishing things. And moreover, the analogy of other diseases would lead to the conclusion that burdening a disabled function with work to which it is unequal will disable it more and more. If the stomach rejects undigested an ounce of beef, it is made worse by the administration of a steak. If the eyesight fails, or the brain reels on slight exertion, common experience forbids us to demand violent efforts.

Therefore you need not wonder to find that cutting off a diabetic's sugar, bread, and potatoes, by no means lowers him. On the contrary, he often gets heavier under the restriction. And one can easily believe the instances recorded by Dr. Pavy where treacle, honey, and sugar, intentionally administered as

an experiment to diabetics, made the patients feel worse and lose weight.

I do not mention in evidence or rate of any importance the increase or diminution of sugar in the excretions under the influence of saccharine or non-saccharine diet. It is less when little starch and sugar are taken, it is more when much is taken. But the real point is the acquirement of flesh, and the test the addition of weight. You will find, when the ordinary mixed food of healthy men is used by diabetics, that much flesh is lost, and that it is regained when a carnivorous dietary is rigidly enforced on them. With the flesh also comes strength, showing that muscle is gained, and not mere fat.

The great point then, in the treatment of diabetes, is to accustom the patient gradually to live entirely on meat, or at least entirely on albuminous and gelatinous food. This need not seem a mighty hardship; the iron-framed Esquimaux do it, and the wiry, tough, half-breeds of the Pampas, with a bill of fare certainly less varied in flesh-meat than our European meadows afford. You may then fairly direct your energies to attain this goal with a good chance of success. What nations live and increase upon may be trusted to nourish a single individual.

Laying this down as the main point in the treatment, let us see what is likely to be gained by it.

You will learn from the history of our present patient that turning him into a carnivorous animal does not entirely remove a diabetic's peculiar ailment. Twenty days after all vegetable matters had been cut off from his diet card, and he has been carefully watched by others set to detect any breach of the rules, still the urine is full of sugar. So that it must be derived from some other quarter than the starchy and saccharine constituents of the food.

We shall feel less surprise at this formation of sugar from animal matter alone when we call to mind that there is a normal secretion in which sugar may be found under even normal circumstances. The milk of carnivora contains it.*

Moreover, sugar may be formed in the laboratory by a process

* Bensch has put on record the presence of sugar in the milk of bitches fed entirely on meat. 'Annalen der Ch. und Pharm.,' Bd. lxi, 221, quoted in Dr. Lehmann's 'Phys. Chemistry.'

of decomposition without the presence of life. Nay, rather only when life is extinct. The simple application of oxygen will cause some animal substances to be converted into sugar. This has been noticed by Dr. Claude Bernard to be especially the case with the tissues which form the liver, which carefully washed from blood and exposed to the air quickly become copiously saccharine. So that your patient has a fertile source of sugar in his own body, even if none is supplied by the aliment consumed. He carries in his abdomen about three pounds of viscus capable of easy conversion into sugar.

But remark it is *dead* liver, not *live* liver, which in health is decomposed as above stated. Normal vital action seems to have another way of removing the hepatic substance, for during life no sugar can be detected as formed from the organ. Diabetes, then, like all diseases of which we know more than the superficial symptoms, turns out to be a death in life, an antepast of the post-mortal properties of the bodily constituents. This is an additional reason for casting about how best to apply restorative medicine in its treatment, and for urging an ample supply of the right material for revivifying the frame. If the dying liver is passing off quickly by the kidneys, we must give the patient quickly the wherewithal to make new liver. Now you gain an additional reason for enforcing animal diet in diabetes.

To accustom this patient to leave off by degrees vegetable aliments, I gave him first captain's biscuits for a fortnight. During that time scarce any weight was gained, and the urine was but little altered. He liked those biscuits very well. Then I ordered him bran biscuits, but he said they were so nasty he could not eat them, and he wasted some of his milk in trying to make them palatable. Nevertheless he increased in weight by two pounds during two weeks, and made eleven pints less urine weekly than on his first admission. And this although he drank as much as he felt disposed to take.

After this Mr. Van Abbott was good enough to give him a supply of the gluten bread which is manufactered by his firm according to the prescription of Dr. Bouchardat. For a week he tried hard to eat it in addition to his former allowance of meat; but I am sorry to say he failed in acquiring a taste for it. His appetite fell off during the experiment, he lost half a

pound of the weight he had gained, and was so annoyed at being pressed to eat the gluten bread that he insisted on returning home on July 12th.

My own feeling is that we do not act wisely in enforcing a dietary which is really unbearable by the patient in any chronic disease. The great object to be gained is to conciliate the stomach, appetite, and fancy into taking the greatest possible amount of animal food, and if practically you find that the patient eats more by having a biscuit, or a crust, or even vegetables with his meals, it is better to give him his way than to act the tyrant.

As to drugs :—

Opium was given to this patient for a week. It did not in this particular instance seem to exercise any influence at all. However, in some cases it certainly does seem to diminish the excretion of water. But is that any advantage? or is it an adherence to the prejudices instilled by antiquated theories that we reckon on help from such an interference? I own it seems to me that if the blood gets loaded with sugar, as analysis proves to be the case, it is better that the sugar should be washed out by an ample diuresis, than that it should remain at the risk of poisoning the tissues. I have never distinctly traced any harm to opium, truly; but I have traced harm to a drug whose action is similar. Cinchona also like opium diminishes the flow of urine, and I once gave that to a diabetic patient. After a short time he became comatose, and after death I found a collection of fluid in the ventricles in the brain. The effused serum was loaded with sugar, which it was the business of diuresis to have diluted and washed away.

For this reason I shun cinchona in diabetes, even when I wish to give tonics for the sake of increasing appetite. I prefer iron and strychnine. An elderly patient of mine with moderate diabetes is now taking these drugs, with advantage to his strength and digestion, and without any hurtful action exhibited in the urine.

The *iodide of potassium* which you see prescribed on the medicine card was given on purely empirical grounds. There are no drugs known to do good to the essential phenomena of diabetes; there were no secondary symptoms demanding special

medication; so I thought it a fair case for an experiment. The result was that at all events no harm was done; the patient continued to gain weight and strength, and did not exhibit any of the usual symptoms of intoxication by iodine.

This is not like substituting an experiment in search of a possible specific in place of rational treatment; such conduct is indeed most blameworthy; but here there is no medicine omitted, for there is none to be given that offers any hope of its possessing an alterative agency, and it is a question of either something new or a mere placebo. I shall try the iodide again on the next similarly pure and uncomplicated case.

People sometimes feel a doubt how far they ought to gratify the patient's unnatural thirst. On this point the same considerations weigh with me which influence my objection to cinchona. I think there ought to be kept up a flow of water through the system in proportion to the abnormal quantity of sugar in the blood, in order that no retention or discharge in unusual places of this material may take place. I therefore let patients drink as much as they feel disposed for.

You will find that the demand for fluid food is closely proportioned to the quantity of sugar required to be got rid of. Thus when the dietary is changed from starchy to meat food, much less is drunk, and much less is evacuated by the kidneys, though no restriction is placed upon the thirst. Such was the case with the lad now lectured on; during the second week he made twelve pints less urine, though he was recommended at the same time to drink as much water as he liked. The specific gravity also of the secretion was not raised, which it certainly would have been had the diminution in quantity depended on any other cause than a diminution of the instinctive call for diluents. I believe the thirst depends on the saccharine contents of the blood; it is therefore wise to gratify it, and to provide the normal outlet for the abnormal constituent.

LFCTURE XXXIX.

MORTIFICATION.

Complete death of a part, contrasted with nekrobiosis—Case of mortified toes from cold and senile arteries—Treatment explained—Preservation of dead tissue from decomposition—Defence of weak vessels—Food—Appetite—Action of oxygen on sore places—Carbonic acid the normal atmosphere of internal parts—Superiority of nature's surgery to man's.

(*Clinical, St. Mary's, June 27th,* 1862.)

The greater part of my lectures have been taken up with those forms of partial interstitial death, those mixtures of half-life and half-death in the same substance, which constitute morbid actions. Schulz calls them "nekrobiotic processes." I wish now to call your attention to complete death, or "nekrosis." I do not mean complete death of the whole body;—I said the few words I had to say on that head in my introduction—but complete death of a part, the general life remaining untouched.

You had an excellent example on which to study this phenomenon in an old man who has been in the wards for the first five months of this year with mortification of the foot.

His history is as follows:—

G. B., aged sixty-six, is a cowman of steady religious habits (as I learn from a cousin of his whom I know speaks truth, for she taught me to do so—in fact my nurse), living very temperately on small wages, seldom eating meat, and still more seldom taking beer or any alcoholic drink. In appearance he is quite a model

for Burns' cottar. His health has been as good as he deserves, though he has felt for the last twelve months or thereabouts not quite so young as he was, and you may observe a sure sign of age in the eye, an *arcus senilis* around the iris. In the second week of last December he got a severe chill by sitting for several hours in wet clothes. He had then much pain in the left foot, and he observed that it was swollen and that its nails were livid. This blueness and swelling passed off when he had lain up for a few days, and then he went to his work again. But at Christmas-tide again he got wet through, and back came the pain in the foot and ankle. On looking at it he found all the toes above and below and their balls quite black, the blackness reaching about half an inch beyond the balls in towards the hollow of the sole. Sensation here was quite lost, the whole foot and ankle were swollen, red, and very painful, the pain extending up the inside of the leg. In this state he came into the hospital on January 3rd. His appetite then was quite gone, the tongue was smooth and clammy with a brownish centre, the pulse large and empty with the sharp stroke usual in old age. Nothing abnormal could be detected by auscultation in heart or lungs.

He was laid in bed with the foot raised above the level of the body. The leg was wrapped in cotton wool, and kept warm with a hot bottle. The swelling went down, and circulation returned to the ankle in a week. An offensive smell being perceived to ooze out from some weeping cracks between several toes, the foot was kept in charcoal powder. When after two months the gangrene began to separate at the edges, a fermenting yeast poultice was applied night and day. For three weeks he had "teacup diet," *i. e.* a teacup of beef-tea or milk every two hours, from four to six ounces of port wine and bark. He then recovered appetite, and ate meat largely, going on with his wine. At the end of May he went out, having lost the last phalangeal bones and the cellular tissue from each toe, some from the sole of the foot, and his old nails. However new though deformed nails are growing.

The object of this treatment, as you may readily guess, was not to restore life to the completely mortified parts, but to the mortifying tissue in their neighbourhood. Our province is not to raise the dead, but to heal the sick.

The only attention which I paid to the destroyed portions was to keep them from putrefying, and to keep them attached as long as may be to their parent foot. You will perhaps say, "Why, Mezentius-like, bind the living to the dead in hateful union? Why not rid the poor man of what he can never use again?" There are several objections to such a trenchant course of procedure. In the first place, probably your rough hand would root up the wheat with the tares, and could hardly help cutting away much tissue capable of regaining vitality. Secondly, the wound would still further render inefficient the degenerated blood-vessels which were the cause of the disease; they would be unequal to the task of healing up the sore, and further mortification would be likely to ensue. Thirdly, there is no better guard for the dying tissue against external injury than the dead tissue which exactly fits on to the place, and shuts out the air more thoroughly than any plaster ever invented. There must, however, be this proviso, that it does not get putrid, so as to be a nuisance to its neighbours.

With the view of securing this preservation from decay, we adopted precisely the principle on which meat is preserved for food—we kept the tissue from air, we kept it from moisture, and we salted it. The foot was carefully wrapped up, first in cotton wool, and then in charcoal powder. But moisture at last began to soak out from the inside, and the parts got podgy; then I used salt and muriatic acid, which acid, uniting with the soda of the serous exsudation also formed brine, and assisted in hardening the tissue.

So much for forming what I conceived to be the best mechanical protection to the weak, half-dying blood-vessels and nerves in the neighbourhood of the dead. Half-dying as they were, we were asking of them extra work, even the growth of new connective tissue, new skin, and a scar—in fact, all we could get out of them. Urgently needful therefore was this protection.

Let us do all we can to save them their ordinary work. With this view the foot was kept absolutely quiet, and raised above the level of the chest; so that at all events it might be spared the exertion of the usual elastic force in the vessels to resist the

gravitating blood; at the same time the defective animal heat was reinforced by a vessel of warm water always kept in close neighbourhood.

And let us lay in good store of the materials for new tissue. Food was administered every two hours in small quantities and in a liquid form, for his stomach turned at the notion of eating. Bark was prescribed, and a daily dose of wine. The desire was begotten by the gratification of it, and gradually the appetite rose; so that not only did he relish "ordinary diet," but before a month was over asked for an extra allowance, in spite of being unused to meat, and in spite of having no exercise or any of the usual calls for nutrition in muscular exertion. Remark here that you must not wait till a sick body of its own accord asks for nourishment by instinctive hunger. In health the stomach is "clock to itself," but in sickness the instinct, or corporeal reason, is overclouded, and the spiritual reason must be its clock. As life returns, so returns the vital desire, and thankfully confesses the justice of the martial law established by its conqueror.

As the new tissue grew it refused to be allied with the now foreign substance overlying it; the former kinship was disowned; it was no longer bone of its bone, and flesh of its flesh; and so there was a separation at the edges of the black mass, and some of the new birth was laid bare. An abnormal and hurtful state of things is thus introduced; it is most unnatural and painful for tissue to have to grow while open to the sharp influences of oxygen—the "biting bitter air," as poets call it. Where oxygen is intended to touch a living surface, that surface is closely clothed in skin or mucous membrane. A fluid loaded with carbonic acid is the healthy atmosphere of an inside part, and thick darkness its light. So we restored as far as we could the conditions of growth and healing; we covered up the part with a fermenting poultice of yeast, which was continuously giving out warmth, moisture, and carbonic acid. Under its influence the restoration went on prosperously.

I believe an atmosphere like this of carbonic acid would be exceedingly useful in all cases of wounds, and that it is from its production that internal lesions, as a rule, heal so much quicker than external. The instinctive surgery of the dog leads him

to cover his wounds with saliva and warm breath, and I do not think man can do wrong in learning of his dog's instructress, experience. In the brute the experience is hereditary, in the man it is almost entirely individual. In the brute it is purely selfish, in the man it is philanthropic. But as a physician, I have no opportunity of putting the principle into practice.

In the fourth month the soft parts, the connective tissue and muscles, gradually rotted off, like the flesh of the corpses watched by the concubine of Saul and by M. Devergie.* And then you were able to appreciate the full advantage gained by the conservative practice. Had a knife been used, nobody would have removed less than the terminal phalanges of the toes at the very least; for they all looked black and dead. But what do you see here? The pads of the toes have rotted off, the bones have dried up into brittle, brown sticks, which are being gradually separated. But on three of them the nails are growing!—distorted indeed, and not ornamental, but still true nails. A rough and ready operator would never have thought of leaving the little bits of nail-matrix, which have themselves grown, and also given birth to those defences so essential to comfort.

I have occupied the greater part of a clinical lecture with this man's semi-surgical case perhaps to the surprise of some, who will cry "ne sutor ultra crepidam." I am desirous, however of thus pointing out to you that I place no limit to the application of restorative principles. In surgery as much as in medicine the thing mainly to be considered and treated is the living part, not the dead part—the normal functions, not the abnormal—the health, not the disease. Mark what is wanting, and what is left whole; supply the former, and use the latter. Make your chief end of ends, "the renewal of life."†

It will require some courage in you consistently to follow this advice. You may be accused of dishonesty for not doing more; and I have even heard it denounced as quackery to call that end which is consequent on our fostering care of the powers of life "a cure." Were this true modesty, the "non hæc

* See illustration at beginning of Lecture I.

† This was the half-title of the first and second editions of my clinical lec- My reason for altering it is given in the preface to this volume.

humanis opibus" of an Iaspis or the "O altitudo" of a David, one would shrink from blaming it; but it is not so; a sort of contrast is attempted by assigning the word "recovery" to such a result, and "cure" to that which may follow antipathic treatment; and it is implied that no credit is due to the medical attendant for the former, whereas by the latter he has fairly earned his reward. In point of fact there is no contrast at all; every restoration to health must depend on a renewal of the deficient life; in every case this renewal must be wrought out through the agency of the vitality remaining yet uninjured;* and all counsel given by us which contributes to bring about this result is strictly curative. Fear not the charge of having done too little; refer to success as an evidence of real activity.

* See Lecture II.

LECTURE XL.

IMPORTANCE OF THE DIGESTIVE ORGANS IN THERAPEUTICS.

Disease of the digestive viscera affects the whole body—Instances, tuberculosis, degeneration, mental disease, gout and rheumatism—Digestive viscera the chief recipients of remedies, and not only of constructive, but of destructive and arrestive remedies—Effects in disease of healthy and unhealthy digestion—Importance of replacing destructive by the aid of constructive action—Digestive tract single.

(*St. Mary's, April,* 1862.)

I am anxious that you should be duly impressed with the importance of the digestive viscera to the cure of disease. In every case, surgical or medical, the modification of the result produced by our efforts depends almost entirely on how far, how wisely or how foolishly, these organs are watched over; whether they are well or ill treated, either by the scientific guidance of the skilled physiologist, or by the empirical rules of the routine practitioner, or according to the tradition of the nurse, or the instinct of the patient. Each and all of these may be useful guides; but where there is a difference of opinion, I prefer trusting to the first-named principle of action, and so does the public, except when in a fit of obstinacy or prejudice, and so, I hope, will you.

It will be my endeavour, then, to give to the attention which I trust will be bestowed upon the functions of these organs, the rock-laid foundation of prescient science, and not the sandy support of mere empiricism.

To an unhealthy state of the digestive viscera physiology enables us to trace, by steps more or less distinct, several morbid conditions not manifested in the organs themselves, but affecting the whole body. Take for example the very common condition, tuberculosis. One cannot fail to connect both empirically and rationally this state with deficient supply. Amongst whom is it most frequent? Amongst those who have either not enough to eat, or those who from imperfect assimilation are unable to convert into blood what they swallow. The starved fluid does not sufficiently stimulate the vitality of the body, connective tissue is removed by metamorphosis, and its place is supplied, not by new healthy connective tissue, but by a cheesy semi-vitalized substance, which we call "tubercle."

The next most frequent material cause of disease in the anatomical structure of the body is degeneration. By birth it is closely related to tuberculosis. Unrenewed effete particles remain as fat in the tissues; and so you get softened and dilated hearts, fatty liver, Bright's kidney, atrophic softening of the brain, apoplexy, &c.

To the same cause may be traced an obscure inefficiency of mind, very common among our chronic invalids and habitual patients. They complain that they awake in the morning, not only unrefreshed by sleep, but seemingly more tired than when they went to bed. There is an unaccountable despondency and carelessness about the future, accompanied by a conviction that something or another unfortunate is going to happen. They have no power to prevent this; and they are not sure they would exert the power if they had it. Their unwilling limbs are dragged languidly to the daily task, but they are quite unable to do anything as they ought. The figures get confused as the merchant adds up his ledger; the clerk knows he has some important duty to perform, but cannot call to mind what it is; to the matron even the light labours of daily housekeeping are a heavy burden. A morbid dislike to the idea of food causes the family meal to be simply repulsive. Sleep is sought, and perhaps obtained, but is broken by painful dreams, or fidgets, or wakefulness. If there is an inborn or hereditary tendency to insanity, now is the time when it bears fruit; spectral illusions, derisive, tempting, or foolish voices

half deceive, half irritate the victim; and he is fortunate if he is saved from crime or a mad-house by the curable source of his unhappy state being correctly traced. But if there is no previous tendency, the mental miseries may go on for years, and yet not produce any positive unsoundness of mind. In these cases, without further symptoms even than those named, you may be safe in referring the *origo mali* to the digestive canal; and the success of your treatment will usually confirm your diagnosis.

There is also a suspicion that some acute diseases of the fibrous tissues, such as gout and rheumatism, may be due to imperfections of the digestive organs. During these ailments organic acids, uric or lactic, and perhaps others yet unnamed, are found in excess over the alkalies; or rather more correctly speaking, the alkalies are in a state of deficiency in respect of the quantity of acid; and, as acids are certainly formed by the decomposition of the food, and one of them (the lactic) especially in great abundance, while the alkalies also come from the food, it is presumed that the cause of the malady resides in the viscera which contains the food during digestion. This idea that the digestive organs are to blame for gout and rheumatism is of very old date; yet it must be confessed that the evidence for it does not increase; and it remains, as of yore, a strong presumption, waiting to be confirmed by a physiological tracing of its steps.

Whatever value we may attach to the evidence of the dependence of diseases on the digestive organs, it is very clear that we look to them for relief from those diseases. Out of the six or seven hundred forms of drugs in habitual use, very few indeed are not occasionally offered to the stomach for acceptance, and an overwhelming majority of them are adapted for use only in this way. If we are still to employ this time-honoured agency in our attempts to cure bodily ailments (and I see no threatening of a change at present), it is surely a matter of great interest to secure the active working condition of the stomach. It is waste toil to try and enter locked doors.

A great advantage of paying special attention to the digestive organs is that, as a rule, they are more directly curable, and that by their means distant parts, otherwise out

of our control, may be favourably influenced. The evil of neglecting them is obstinate disobedience of the disease, or rather of the body of the patient, to any drug administered; recovery rather in spite than by reason of it; and in a candid mind the development of scepticism, the great enemy of right reasoning in medical matters.

Let be observed, that it is not constructive medicines only, not alone aids to the normal work of the alimentary canal, that we try to put in through its walls. We look to it also to take up those whose agency is, physiologically speaking, the direct converse, whose effect is that of augmenting destructive metamorphosis. We call upon the bowels to absorb calomel as well as bark and wine and oil. We shall find it then of equal importance to have them in a normal state when our aim is destruction, as when it is construction or arrest.

When a sudden poison or paralysis has fallen on these gates of entrance, our hands are paralysed too; the staffs we lean on fail us. What buckets of physic used to be poured through the half-dead bowels in our first epidemics of cholera! It might just as well have been thrown at once into the night-pan—its ultimate destination if the patients lived long enough.*

So that calomel pills, and calomel powders, and opium, and cayenne pepper, were a frequent constituent of cholera stools; in short, I believe that nine tenths of the drugs swallowed in the stage of collapse followed the same fate, or the patients could not have survived the poisonous doses which are recorded to have been given.

But it is when reconstruction is the immediate object of the remedies sought to be administered, that the importance of the digestive organs is most obvious. Mark the difference between two consumptive patients taking cod-liver oil. One, whose digestion has been carefully brought into a healthy state, swallows it in large quantities, at any time of day you please, complains of no inconvenience, enjoys life, does credit to the doctor, laughs and grows fat. Another, in consequence very likely of some

* I once found a drachm of ipecacuanha, which had been administered with other emetics three hours before death, safe in the cardia of a patient, in whom it had produced no vomiting, and had not been moved towards the pylorus.

easily removable cause, nauseates the smallest dose; if in spite of instinctive repugnance it be forced down, it gets rancid; fetid eructations follow; and the patient not only gets no advantage from the drug, but is prevented by it from deriving the usual benefit from the daily meals; appetite is lost, and rapid emaciation shows how little construction is carried on in the tissues.

Watch a case of typh-fever, and see what immediate improvement follows the shedding of the dead epithelium with which the mucous membranes have been coated—a change which is announced by what is called the "cleaning of the tongue," but which foreshadows much more, in fact the cleaning of the whole intestinal tract. See how immediately on this the poisoned nervous system begins again to renew its life, and delirium ceases, as new nervous matter fit for duty is generated. Or watch another less fortunate case of the same malady, how as the tongue gets dirtier and dirtier and drier and browner each day, the weakness of the nervous and muscular system increases, and hope is more and more clouded over.

In both instances, the difference between one case and another, between the patient who is a credit and a joy to us and the patient who continues to wring our heart with anxiety, lies in the more or less vitality of the digestive mucous tract.

Then again, however sceptical we may own ourselves as to the dependence of gout and rheumatism upon the digestive viscera, it is through those organs that we mostly try to reach the malady. 'Tis through those organs that we endeavour to get our large doses of potash and our iodide of potassium into the blood. There are practitioners who, in their treatment of these affections, rest more exclusively on the drugs named than you have seen me do; and to them even still more than to us must the integrity of the digestion be a care.

We must remember also, that it is of no use to employ the best possible means of staying the morbid symptoms, unless the digestive organs assimilate sufficient material to replace that which is diseased, and to remove which we are bestowing our pains. Labour is wasted in clearing away abnormal structure, if new structure does not take its place. To that end the only path is to ensure the assimilation of food.

And to ensure the assimilation of food, the stomach must be in working order. So that in point of fact the only fair trials of depletory measures must be connected with feeding, and they who would uphold their good fame must be careful of their patient's digestion.

The digestive tract has not the advantage enjoyed by the respiratory and by the upper part of the urinary apparatus, and other parts, of being double. An animal has two lungs, two kidneys, two hemispheres to his brain, two testicles or ovaries, but only one stomach, and one intestinal canal. This is a further reason for great caution in preserving each in its integrity: we have less to spare for disease to affect. A deposit of tubercle (for instance) the size of a nut in the pulmonary tissue may be neither here nor there, may be never known by its effects. But put it in the heart, in the peritoneum, or in Peyer's glands, and what a disturbance is produced!

This singleness also helps to explain the powerful influence which derangement of any one of its parts has not only over the whole tract, but over the whole body and mind. No chain is stronger than its weakest link, and an interruption of the function at one point is an interruption of the whole.

[I do not therefore think it will be out of place in a volume of lectures selected and edited as illustrations of restorative medicine or the artificial renewal of life, to insert several given a few years ago, which were specially devoted to a consideration of disorders of the stomach and bowels. I look upon these viscera as a means of cure, as an agency for me to employ for the renewal of life, in fact, as part of my Materia Medica. The lectures which follow may then be considered as being upon the subject of therapeutical agents rather than as on the subject of disease, and are set together as having that natural bond of union.

Questions of morbid anatomy and diagnosis are here, as throughout the volume, noticed as shortly as possible, and pathology introduced only as far so may be needed to afford a reason for treatment.]

LECTURE XLI.

INDIGESTION IN GENERAL.

Justification of the term as designating a class of diseases—Position of it in nosology—Its importance—Examples—Its action on chronic disease—on acute disease—Use and abuse of purgatives—Cause of death in acute fevers—Mode of introducing food.

(*Extra course, St. Mary's, Summer Session*, 1857.)

The term "indigestion" or "deranged digestion" speaks to the mind of the physician of a very large class of morbid phenomena, various in their nature and appearing under a great variety of circumstances. There are those who would banish the words from our nomenclature; some because the outward manifestations are so diverse that it is impossible to bind them together in any symptomatic nosology; some because the parts of the body whose morbid states induce indigestion are so many that it cannot be brought under any anatomical arrangement. It is quite true that a definition of it cannot be given according to the symptoms, and equally true that it cannot be called a disease of one part or of any set of parts or tissues. When symptomatic phenomena are made the principle of classification, those attendant on this morbid state are so numerous and so discordant that they appear in every class; and if the organs that originate diseases are employed to give them names also, there are very few organs in the body which do not sometimes produce the disorder in question. Still to the practitioner and to the common sense of the non-medical public the name has a distinct meaning, and is a definite guide to action. No nosological, anatomical,

or even chemical considerations have prevailed over it, simply because it indicates a true thing, because it applies to a class of disease having a connecting link in nature, though not in some of our artificial systems.

The common link which ranges into one class the diseases of deranged digestion is a partial defect in the necessary supply of that of which the body is built up, before it arrives at the medium of distribution; these diseases are *anterior* to assimilation and to the blood; they intervene between life and the new matter which it seeks to renew itself withal.

This explains the fact mentioned before and familiar to us all, of deranged digestion affecting more or less all the functions of the body, and producing such a variety of morbid phenomena as immediate or remote consequences. It perverts incipient life at its very source, and therefore perverts all its future manifestations.

I am very anxious that you should have brightly pictured on your minds this idea of the position in pathology of diseases of digestion. It is of the utmost importance in your treatment of patients. It is of no use for you to pour in remedies, however suitable for the removal of some morbid constituents of the body, if the new material which is to replace it is itself insufficient in quantity or morbid in quality. While if you set to work in another way, and endeavour to provide healthy material, this of itself will act as a remedy, even though other treatment should have been neglected. Make it a universal rule, then, that *the special medication is never to interfere with or take the place of the supply of the materials of life.*

In the management of a deranged digestion, whether existing alone, or as a complication of other complaints, it is certainly important to know what organs are in any of the degenerated conditions which form the province of the morbid anatomist. Your prognosis is modified, and to some extent your treatment is affected by such knowledge. I do not deny the importance of this, but I assert that it is infinitely more important to observe the functional disturbances which are the immediate impediments to the healthy renewal of the body, and to learn how to modify them for the advantage of the patient. You may remember my pointing out in the hospital the other day,

with respect to a consumptive man, how little it helped us to know that half of the upper lobe of each lung was filled with crude tubercles: pulmonary remedies had been of no benefit to him; but the reflection that the stomach was secreting an excess of mucus at the same time with the lungs, led to effectual means for the relief of the poor man's progressive emaciation, cough, and other distresses. I also, a few weeks ago, called your attention to a girl, the mitral orifice of whose heart was narrowed by rheumatic inflammation in childhood. On her being carried into the hospital, her face was like that of a corpse, and she could not stand without fainting from palpitation. I presume no sane student would expect to see remedies applied for the dilatation of that mitral orifice whose contraction is the source of evil: despair was not an illogical conclusion from the diagnosis, and I was but little surprised to hear the remark "this is not much of a case for treatment." Yet observation of the functional state of the alimentary canal, indicated by the œdematous tongue and fauces, made me express an expectation that she would walk home with colour in her cheeks. This she has been able to do, and the better-nourished heart now beats steadily and evenly; though its mitral orifice is as small as ever, if the ear and stethoscope are to be trusted.

On stating in consultation an opinion that some viscus is chronically degenerated, one is often met by the remark, "Well, what is to be done?—we cannot cure that?" Very likely not; then try and find something else which you can cure. In the great majority of your patients you may find this curable something in functional impediments to the entrance of nutriment into the medium of assimilation; and when you once can get nutriment in, it will act as the best medicine. Do not, therefore, give way to despair even after it has become certain that the principal viscus which gives a name and origin to the disease is incurable. And repress any conscientious fancies that you are not fairly earning your fees in giving careful attention and advice, though you prescribe little for the organ mainly affected. It is never too late to try and administer to the failing organ the most potent of all medicines, the healthy human blood of the patient himself.

The more I see of disease the more convinced I become that

the most important function for us to pay attention to in all cases is the digestion; in chronic cases it outweighs all the other functions put together. I am led to this conclusion not so much by physiological reasonings, or by the important position of this function in the great circle of life, as by observation of the effects of remedies, prescribed perhaps with quite different views, and often without any thought of the digestion at all. The effect of climate, for instance, in pulmonary consumption, is proportioned with extreme accuracy to the degree in which the absorption of food is improved or injured by it. I had a striking instance of this a few months ago, in the comparison of letters which I received at the same time about a couple of young ladies whom I had sent to pass the winter in a warmer climate. The elder (S. S.) was last year much the more advanced in disease; half of the right lung was rendered impervious to air and immovable by tubercle, local inflammations, hæmorrhages, and pleural adhesions. She had also frequent dysmenorrhœa, and occasional menorrhagia. The younger (E. W.) had a small deposit of tubercle at the apex of the right lung, which excited cough, but no hæmoptysis or pleurisy. She was the stronger and more muscular of the two, and had least right to hereditary disposition, for all her family are alive, while S. S. has lost her mother by phthisis. Both had been under long courses of medicine by my direction, so I set them to begin the winter at any rate, and to go on as long as circumstances admitted, without any. What now is the result which I said struck me so forcibly? S. S., the most diseased anatomically speaking, who had certainly the greatest amount of mordid tissue in her body, found the warm air assist her sluggish circulation, enable her to take exercise, improve the appetite, and add unwonted energy and spirits. No food was passed undigested, and the evacuation from the bowels was normal in time and quantity. The consequence of which condition of the assimilating organs, bowels and blood, has been a most decided amelioration of the pulmonary local symptoms, in spite of an intervening attack of hæmoptysis. There is scarce any pain, cough, or dyspnœa; she has increased in strength and weight, and boasts in her letter that she had one day ridden her pony five-and-twenty miles.

E. W. had a tendency to a relaxed condition of bowels—not absolute diarrhœa, but the passage once or twice a day of unformed pultaceous stools, containing a large quantity of undigested food. It was easy enough by medicines to prevent the motions being too frequent, but difficult to amend the assimilation of aliment. This diathesis seemed aggravated rather than improved in the mild climate; there was greater and greater inability to take exercise; then a return of pain and tenderness in the upper ribs, and at Christmas time the surgeon in attendance found a deposit of tubercle taking place at the apex of the left lung, in addition to what already existed in the right. Emaciation then commenced, and continuously progressed, quite unchecked by cod-liver oil and other expedients, which I thought it right should be tried, though without much expectation of success. In this patient my only hope is in the restoration of the digestive organs to a healthy state.

The remedy, the effect of which I thought was strikingly exemplified in this pair of cases accidentally reported together, is soft and warm air in incipient consumption. The agreeable effects on the respiration, the relief of dyspnœa, the power of getting out into the open air, were equal in both, but how different has the result been!

A very moderate experience of the cases we have seen together in the hospital will soon enable you to class a dozen or more as resembling in their type one or other of the two above quoted. The atmosphere of our well-ventilated wards, and their even temperature in comparison with the depressing coldness and chilly damps of the streets whence our patients come, represents on a small scale what Torquay, Madeira, and Mentone are to the wealthy. And you may thus as students see what private practice will still more strongly impress upon you, that the effect of climate on digestion is the most important part of its action. The atmospheric change alone without medicine will benefit those who resemble the class represented by S. S., more or less, in proportion to the extent of their disease, whilst those portrayed by E. W. will usually grow worse in spite of drugs.

In all forms of dropsy, again, the effect which you desire to produce by remedies is strikingly dependent on the condition of the alimentary canal. Where the portal system is congested, I

have given that strongest of drugs, elaterium, in doses gradually augmented up to three grains, without any of the vigorous hydragogue action naturally following; and then, by applying a few leeches to the anus, so as to disgorge the abdominal veins, half a grain has produced excessive purgation with reduction of the dropsy.

Another striking example of the dependence of remedies on their influence over the digestion is found in anæmia. If, as generally happens, iron improves the condition of the alimentary canal, so that the stools, from being scanty, scybalous, and mucous, consisting mainly of wind and half-digested food, become natural and regular, then the body is renewed by fresh nutriment, and the strength is rapidly reinstated; but if it irritates the mucous membrane, so as to make the evacuation irregular, black, and slimy, your patient remains as anæmic as ever. Hence the importance of suiting to the case the different form in which the metal is presented. If ready solubility and presentation to the absorbing surface, in such a shape as to get an entrance of a large quantity quickly into the system, were the only thing to be considered, the question as to which is the best preparation might be left to the druggist. But it is not so; very often the easily soluble salts so disturb the gastric mucous membrane that it refuses to pour out that secretion which is the chief solvent of albumen; the food passes unaltered into the intestines, and putrefying there, increases the disease. Whereas a sparingly soluble form of the medicament passes unaltered through the stomach, and exerts its main energy on the intestines. Again, some preparations, both soluble and insoluble, are more or less astringent, and have various qualities acting on various parts of the alimentary canal, which render them appropriate or not to individual cases. So that not the most elegant, not the most praised as ingenious by the druggist or scientific chemist, is the oftenest selected by the judicious physician, to whom the cure of the patient, not the harmony of the prescription, is the object in view.

It ought to be better understood that the fitness of any substance ingested, whether food or medicine, for its final destination, is not the only thing to be considered. Its capacity for entering into the circulation must be taken into account, and,

above all, its dynamic influence over the organs of absorption and digestion. As a general rule, iron is the chief agent we think of in anæmia. We think of it for its direct power of increasing the hæmatin of the blood. Yet it is by no means always the first, or even the best remedy when the blood-discs are deficient from faulty assimilation. I remember when I was a student noting down as a paradox that salts and senna acted as a tonic in three cases running, where iron and bark and bitters had done no good; yet that I could not find in any work a tonic action assigned to purgatives. I then saw that the action of medicines was not entirely according to their rating on our books.

The fact is, that until you have removed the sluggish state of the regions presided over by the portal circulation, which are doing nothing but forming mucus and obstructing absorption, you cannot get the protein compounds taken up, and they form a much more important constituent of blood-globules than even iron.

And it is not only the general health that is benefited by attending to the functions of the stomach, but even organs as far as possible removed from it in a physiological point of view. A patient consults me from time to time who has an enlarged prostate. When digesting well, his urine is quite transparent, and free from mucus, even when microscopically examined; but if the stomach is disturbed by any imprudence or accidental illness, there is a copious formation of pus in the bladder.

I shall return to this subject when I come to speak of medicines separately; now I mention it merely as an accessible instance to show you how all-important in treating chronic disease is the condition of the alimentary canal.

In acute disease you will be almost equally disappointed with the effect of your remedies, if you do not, either by their means, or by other means in addition to their administration, bring the alimentary canal into a proper state for their reception. In no cases is this more marked than in erysipelas and delirium tremens, and you may have observed that I scarcely ever pass a bed in the wards containing a patient affected with one of these diseases without calling your attention to the fact. I point out to you that cinchona and wine are the proper remedies for the

weak rapid pulse, the yellow pasty tongue, and the low inflammation of the skin in erysipelas; but that if you give these remedies without clearing away the saburral epithelium from the stomach and bowels, they are quite thrown away; the circulation continues as weak as ever, and the patient goes on advancing towards death. But if you have got a purgative to act, and are then in time with your alcohol and bark, the corner is turned, and every change which takes place is a change towards health. I have often shown you, in the little room where we put raving cases of delirium tremens, a man who has been taking large amounts of laudanum, morphia, and solid opium, yet is as rabid and demon-haunted as ever, his eyes never closing to the horrible visions that surround him. But on giving him an efficient dose of salts and senna by mouth or rectum, powerful opiates become no longer requisite; he goes off into a quiet sleep, sometimes without any more, sometimes with an ordinary quantity of laudanum, and the next day he is usually calm enough to be removed to the common wards.

Do not misunderstand, or suppose me to have turned "evacuator," recommending an artificial diarrhœa as a panacea; on the contrary, I am anxious to warn you that there are cases where a purged state of the alimentary canal, natural or artificial, is most injurious. I would instance especially pneumonia and low fever. In the first, the treatment pursued is beneficial just in proportion as the bowels are not purged; and if you give a cathartic, you very often destroy all the good effect of your remedies. In adynamic fevers, the prognosis may be almost entirely governed by the average proportion of solid matter to the liquid in the stools, and by the degree in which the food is digested. Any expedients which increase the amount of solid and diminish the liquid intestinal evacuations, any which promote the taking up of nutriment by the mucous membrane, are doing good; any that act in a contrary way, do harm.

In pneumonia and low fevers, three-quarters of those who die, die of starvation. I mean that the real immediate cause of their death is the non-renewal of the blood by the supply of fresh matter. Both veins and arteries are filled with a dark half-dead fluid, a great portion of which is incapable of fulfilling the functions of life at all. Expose this black blood to the air,

and it remains nearly as black as ever. No oxygen will redden it, for it is too dead to imbibe oxygen, and it is only fit to be evacuated. But then, when it is evacuated, something must supply its place; new blood-discs capable of living and absorbing oxygen must be made, or the patient dies. If you think only of getting rid of this dead matter by bloodletting and other evacuants, or if you think only of arresting the rapid destruction of the still living matter by alcohol, you are taking an imperfect view of your business, and not doing all that may be done to renew the patient's life. At the same time that you fulfil the other indications, it is your duty to adopt expedients for promoting the supply of nutriment to the absorbents.

That is not to be accomplished by throwing in at once a large quantity of food, which decomposes and stops digestion entirely. The alimentary canal either rejects the load or suffers from such treatment, and is all the more starved by the very abundance, like the Roman girl in Livy's legend, who was crushed to death by the stipulated rewards of her treachery.

The way to attain your object is to give very small quantities of food at a time and very frequently, so that a continuous flow may be kept up through the alimentary canal without overburdening it. The system of a patient laid up with acute disease is like that of a new-born infant, in the weak hold it has of life, and in the constant support it requires; and the stomachs of the two resemble one another in the insufficiency of the meal they can take at once to satisfy their wants for any length of time. Treat them, therefore, in the same way; and as in proportion to its youth you order an infant to be fed frequently, so in proportion to their illness feed frequently your sick patients. A person prostrated by a fever or by inflammation of an important vital organ, such as the lungs for example, ought not to be more than two hours without food while awake, and I have not unfrequently administered it in doses of a few spoonfuls every hour, night and day, with decided advantage.

You may take a lesson, too, from the nursing of infants as respects the nature of the food; milk is the most perfect you can give. The only disadvantage is, that the caseine may be suddenly coagulated all at once in the stomach, and then, instead of passing on gradually, it has to remain there till

enough gastric juice is secreted to dissolve it, and enough energy exist in the peristaltic muscles to move the mass onwards; till which time it stops the way. The better plan is to mix sufficient lime-water with the milk, to prevent any large quantity of lactic acid from being free; much of the milk will then pass the pylorus uncoagulated, or at any rate in very small coagula, and be digested by the intestinal juice, with no labour to the stomach.*

You saw a month ago, in the Victoria Ward, a striking instance of the effect of mere nutriment so administered as to be capable of being absorbed in acute disease. A young woman, the subject of pulmonary tubercle, became affected with pneumonia of the whole of one lung. Her lips were livid; the pulse not to be counted; the respirations irregular, and between forty and sixty in the minute; there were râles from the collecting of mucus even in the bronchial tubes of the unaffected lung; the tongue had a smooth yellow coat; and the rupugnance to food was very great. She had up to this period had nourishment given, or rather offered, only at the usual times of meals. She had had some stimulants, but they had been thrown up. I then ordered her a pint and a half of beef-tea and two pints and a half of milk, guarded with a pint of lime-water, to be taken, a small portion at a time every hour, so as to finish the whole in twenty-four hours. The next day a sudden revival had taken place; the tongue had cleaned; the respirations were about twenty-five or thirty; and so she continued to hold on to life for five days, when a relapse occurred, and she died. She died truly, but it seemed pretty clear that death would have occurred from the first condition in which the patient was seen by you, except from the continuous supply of nutriment. I cite this case rather than any of those where final recovery takes place, because in them you might doubt whether the disease really is of a necessarily fatal nature; whereas here you have proof of the fact in its killing the patient soon afterwards. It was of a fatal nature, yet death was arrested for a time, and the sharpness of the symptoms made

* On the action of the intestinal juice see Bidder und Schmidt; 'Die Verdauungssäfte (von Darmsaft);' and 'Digestion and its Derangements,' by the author: Book I, chap. v, sect. 4 and 5.

the changes more striking than in patients where your memory has to cast back for days or even weeks, in order to trace the effect of treatment.

Another patient, now convalescent, illustrates a still more purely dietetic treatment of acute disease. I mean a young man who was brought in three weeks ago with low fever, his tongue dry and brown, rose spots on the skin, weak fluttering pulse, and the stools smelling like rotten flesh. The only drug I ordered him was a small quantity of chalk-and-mercury powder at night, and some effervescing saline draughts.* You have often seen under such treatment the fetor of the stools continue, and great weakness follow, even in those fever cases that ultimately get well. But I ordered at the same time a diet of milk and beef-tea, to be taken in small quantities every hour, and a few ounces of port wine. To assist the absorption of this nutriment I gave him also a scruple daily, divided into three doses, of a powder containing pepsine; and I was curious to know what the effect would be on the digestion, for it was the first time I had given it in low fever. The result was most encouraging—for the stools immediately lost their putrid fetor, and the food, instead of being passed in a putrid undigested state, seemed to be entirely consumed in the bowels. In spite of several discouraging symptoms, I have never seen a case of bad fever where the stools were less fetid, or where there has been less emaciation and debility during convalescence.

My object in this lecture has been to lead you, in your clinical studies in the wards, and also in after life, to rate aright the importance of the management of the digestive organs in disease. I mean in disease generally, and not in that which specifically affects those organs alone. And in future lectures on the same subject, I intend the descriptions I give of morbid phenomena, and the simple classes into which it is convenient to divide the impediments to digestion, to apply equally, whether they are alone and give a name to the illness, or whether they are united to anatomical changes which afford ground for a more convenient generic designation.

Do not be deceived by the expression, "merely symptomatic,"

* I had not at that date commenced the acid treatment of continued fever detailed in a previous lecture.

sometimes applied to the derangements of digestion in phthisis, anæmia, amenorrhœa, dropsy, hysteria, &c., such as I have cited for illustration. All parts and functions of the body are so knit together to form the great circle of life, that their comparative value to individual existence is more a question of time than of power. The failure of any one shortens the days more or less, and a "mere symptom" is as often the immediate cause of death as an organic change or a pathological process is.

I shall, in the five following lectures, give as concise a sketch as I can of the principal modes in which the function of digestion is deranged, either alone or in connection with other diseases, pointing out on the way what rational indications of treatment they afford. I shall afterwards comment on some of the most important means used to effect our purpose, and point out their bearing upon rational medicine.

LECTURE XLII.

SLOW DIGESTION AND ACIDITY.

Healthy digestion is easy, quick, and complete—Unhealthy digestion is painful, slow, and defective—Phenomena exhibited in unhealthy digestion—Heartburn—Acidity.

(*Extra course, St. Mary's, Summer Session,* 1857.)

Healthy digestion is *easy, quick,* and *complete.* There can be no excess of it, for food cannot be too easily, quickly, and completely converted into chyme and taken into the system, and there is no such thing as too much health.

In ill-health digestion is impaired in one or more of these qualities—it becomes *painful, slow, defective.*

You may use Greek words, and call the above-named erring qualities of the digestion dyspepsia, bradypepsia, and apepsia; only remember, that making the old adjectives into new substantives adds no whit to our knowledge, and, unless care is taken, runs some risk of being a stumbling-block to its progress. For when we have in this way given a proper name with a capital letter, we are apt to think we have defined an individual and active motive power, instead of what is really the deficiency of a function, and thus we fall into the errors of our forefathers, whose dangerous aims at destroying their abstract foe the "Disease," instead of restoring the existing patient, led to so much bad practice in the generation now passing away. I shall use the English adjectives, but first I will say shortly what I mean by them in this connection.

Painful digestion may be, and often is, both defective and slow; but, on the other hand, it not unfrequently also is com-

plete and performed with sufficient quickness. All that is intended by the word is to express that it is accompanied, at some stage of its progress, by feelings varying from slight discomfort to absolute torture.

By *slow* digestion, I mean that the act in some part of the alimentary canal is not completed by the time when the convenience of the individual and of society require that it should be completed. The stomach, for instance, may retain so much of a former meal that it is not in a fit state to receive the new one which is absolutely required for the sustenance of the body. This is generally indicated by a want of the natural appetite which arises when the upper portion of the digestive apparatus is ready to do its work, and, in chronic cases, by imperfect nutrition, anæmia, debility, &c. Or, if we attempt to force food too quickly on the unwilling stomach, we have chemical decomposition and defective digestion as consequences.

By *defective* digestion, I mean that food capable of nourishing the body cannot do so from lack of certain changes which it should naturally undergo in the alimentary canal. It is passed from thence either unaltered or chemically decomposed. There are seen in the fæces, either by the naked eye or the microscope, lumps of muscular fibre, fat, starch, &c.; or else the products of their decay, consisting of various obnoxious gases and acids, are developed in quantity subversive of comfort.

The morbid phenomena accompanying these errors of the digestive function may be divided according as they occur during the *first* stage, that is, before the alimentary mass has passed the pylorus; in the *second* stage, that is, during its passage along the small intestines; or, in the *third* stage, after the passage of the ilio-cæcal nerve. Now remark, I do not call, and I wish you not to call, these phenomena diseases *of* the stomach, or *of* the intestines, or *of* the colon. They are not so, and must not be treated as such. The discomforts felt in the first stage, for example, may be due to organs far away from the stomach,—to the uterus, to the kidneys, to the teeth,—yet they may be called by the same names, and treated by the same remedies as when they are owing to anatomical changes in that part. So those of the second and third stage often are traceable

not to anything wrong in the ilia or colon, but to excess of mucus or deficiency of pepsine in the stomach. This is a consideration of much practical importance, for it much influences the treatment.

In the first stage of digestion we may notice, as common phenomena, those generally known by the following names:—

Heartburn; Acidity; Weight; Tightness (or distension); Oppression; Wearing (or boring) pain; Cramp (or spasm); Eructation; Vomiting.

I would commend to you these words rather than any new Greek or Latin compounds which profess to include them. Nine times out of ten the artificially manufactured terms are not nearly so accurate as those which have become defined by daily use.

HEARTBURN

is a sense of heat or cold (they are much the same) at the cardiac orifice of the stomach, running at intervals up the course of the gullet.

From the effects which alkalies have in allaying temporarily this pain, there seems no doubt that it arises from the action of the acid contents of the stomach on the cardiac and œsophageal nerves. The gastric mucous membrane itself does not suffer from acids; it secretes them,* and bears them in contact for the remainder of the day without inconvenience. The gullet, too, will bear them for a short time; swallowing a mouthful of sour victuals or drink gives a healthy man no immediate inconvenience; but a continued exposure becomes painful in close proportion to its length, as may be easily tried

* There appears no doubt about the gastric juice being *secreted* acid, and becoming neutral only from admixture with saliva. See the recent experiments of Drs. Bidder, Schmidt, Grünewaldt, and Schröder, compared in my 'Digestion and its Derangements,' chap. iv; and 'Experiments on Digestion,' by Dr. F. G. Smith, Philadelphia, 1856. This last-named very valuable renewal of observations on the patient with gastric fistula, formerly a servant of Dr. Beaumont's, seems to show pretty conclusively that in the human subject the acid secreted is not hydrochloric, but probably lactic. The origin of the finding hydrochloric acid in gastric juice is that the lactic acid fermentation decomposes the chloride of sodium contained in all animal secretions.

by pouring down such articles slowly for a short time, whereby pain will be produced even in the most healthy.

Heartburn, or pain from the action of acids on the cardiac end of the œsophageal plexus, may arise in three ways:

1st. By over-sensitiveness of the nerves;

2nd. By too long exposure to the acids of digestion;

3rd. By too much acid being formed.

(1st.) *By over-sensitiveness of these nerves* (=Over-feeling= hyperæsthesis*). This is sometimes, but not always, accompanied by over-sensitiveness in other parts of the body, and is the form of heartburn which weak, nervous, hysterical persons suffer from. It comes on almost immediately after eating, directly the contents of the stomach have begun to assume that degree of acidity which is natural and necessary to them. If vomiting does not occur, it continues till they have become neutralized either by the saliva which usually flows abundantly down the œsophagus, or by taking some alkali, or by the moving on of the mass towards the pylorus.

The worst of this neutralization, natural or artificial, is, that a good deal of the albuminoid food remains undigested. It is absolutely requisite for its solution by the gastric juice that it should be acid while in the stomach; and if this natural acidity is prevented, because it happens to be painful to the over-sensitive nerves, the peptic solvent cannot act. Thus the digestion, from being painful, is made defective also.

A peculiarity of heartburn from over-sensitiveness, which often is a great assistance to the diagnosis, is, that one kind of food brings it on as much as another; just in the same way as the peculiar grinding pain of gastric ulcer (which will be spoken of in a future lecture) is frequently to be distinguished by there being so little difference felt in the effect of different articles of diet. It is to be observed, also, that it is very often worse after the early than after the later meals, even though the dietary should be more sparing and more digestible. Indeed, in private practice, where one sees lighter diseases than those in hospital

* Here is a flagrant example of the confusion attendant on coining words. Hyperæsthesis is used now in writing and speaking, with seeming propriety, for *morbid excesses of sensation;* but so lately as 1831 it is defined in Hooper's Dictionary, "error of appetite."

wards, I have notes of several patients who have eaten dinners and suppers without distress, but who invariably suffered after breakfast.

This form of heartburn usually occurs in nervous, sensitive persons, whether their state of system is congenital, or induced by outward circumstances. Any untoward condition of the parts supplied by the abdominal plexuses of sympathetic nerves often brings it on. Tumours of the uterus or pregnancy are a very common cause, and excessive or painful menstruation often induces it in the female; and in the male, I have known it brought on by piles and by mere constipation. It is often accompanied by vomiting in persons who have a tendency thereto. In these cases you have an opportunity of examining the contents of the stomach, and confirming what I stated about their being in a normal condition, by no means over acid or otherwise unnatural.

Over-anxiety, watching, harassing mental emotions, and, in short, all external circumstances which cause over-sensitiveness, induce this state of digestion. Local pressure on the epigastrium will also fix the disorder in that part. It is curious that while the ordinary nerves of feeling appear blunted by pressure and the frequent repetition of excitement, the sympathetic should be made more sensitive. Such, however, seems to be the case with the epigastric plexus, to judge by the frequency with which this form of heartburn occurs in shoemakers, needlewomen, clerks, and others whose ordinary occupations involve pressure on the pit of the stomach.

As anæmia, debility, and occupations which occasion them, induce this heartburn, so it, too, will react, and increase them, or even bring them on. An impoverished stomach, thus unable to bear the labour of digestion, becomes poorer still from defective supply. That happens in the human body which Martial complains of as one of the vices of civilization—those most in want gather least wealth—"Dantur opes nulli nunc nisi divitibus." But at the same time a slight change of habits, or slight relief from medicine, will equally react beneficially, and commence a a march towards health with unhoped quickness.

It will also, too, sometimes be associated with, and very much aggravate, the intermittent headache of marsh miasma, causing

"brow-ague" to begin after the midday meal, instead of at other times.

The suddenness with which heartburn will come on, and the rapidity with which it often goes away, is a great help to the diagnosis of the nervous origin of this affection, and it is also a great encouragement to the physician to promise relief to the sufferer.

The sketch I have given of the physiology of this disorder points out the treatment most likely to be successful in the end. The aim must be, not to neutralize the acid, but to blunt the over-sensitiveness of the nerves. This can be done, first, *directly*, but temporarily, by medicines known experimentally to have that effect on sensitive nerves; secondly, *indirectly*, by strengthening the whole system, so that those nerves along with it may become hardier to bear the brunt of their necessary duties.

You have seen me often in the wards of this hospital begin the treatment with hydrocyanic acid and bismuth, and in a few days commence the use of steel, or valerian, or quinine. The benefit found from the first-named drugs is decided indeed, but it is temporary, and few cases will get permanently well unless they are followed up by the tonics. At the same time, there is a great advantage, still greater in private than in hospital practice, in commencing with a medicine whose influence is immediate, and which will gain the confidence of your patient for any future plan you may adopt.

Where brow-ague, or any other form of neuralgia, is concomitant or consequent, you will best treat it by four or five grains of quinine, taken an hour and a half before the meal after which it comes on—that is to say, in most instances, the midday meal. I have found this treatment of the neuralgia more effective than that by iron, the quinine curing not only more certainly, but more rapidly.

Sponging the body with cold sea-water, and the shower-bath, are often most useful remedies, acting doubtless in a great measure through the general system. But cold sponging or douching the epigastrium, which may be easily managed sitting in a hip-bath, appears to have a special local action, and certainly does still more good.

The tonics which must follow up this special treatment may

be varied according to the case and the patient's convenience; but, as a general rule, I find none do better than iron.

(2nd.) *By too long exposure to the acids of digestion.* Many influences, which in moderation are rather pleasant than otherwise to the sensory nerves, become exquisitely painful when long continued. For example, the immersion of a limb in water a few degrees below the temperature of the air is not disagreeable, and may be kept on with intermissions for any length of time; but it becomes absolute torture if persisted in without an interval of rest. So, in many cases, a sluggish stomach, in which the progress of digestion is too slow, causes the cardiac orifice to be so long steeped with acid that it becomes painful, though a proper exposure for the natural length of time could be borne with ease. Just in the same way, a continued dribbling of fæces will make the anus sore—a continual running from the nose excoriate the nares, &c.

This form of heartburn never like the first comes on immediately after eating. It often does not occur till four or more hours are passed; in fact, till the period at which the stomach ought to be nearly empty, and preparing for another meal. But the most usual time is an hour after eating. Its long continuance will, however, be apt to induce that tenderness of nerves which constitutes the first form, so that it will approach nearer and nearer to the time of meals, till at last it commences immediately. It differs, though not invariably, in one important diagnostic peculiarity: that it is more common after the later than the earlier meals. It will also, like the first form, bring on nervous headache, and occasionally a decided intermittent neuralgia, aggravated by the same causes, and removable by the same remedies as that arising from marsh miasma. Even if the meal should be omitted, this headache will still come on; but if the time of the meal be changed, the time of the headache will change with it.

Though the œsophagus is relaxed so as to admit of some regurgitation, yet what comes up is seldom more than air, usually of a neutral inoffensive character, and not in the great quantities and with the explosive force which marks the formation of carbonic acid by fermentation in the stomach.

The persons in whom it occurs are active men of business,

literary labourers, clerks, over-thoughtful and over-careful. But when once acquired, it is very apt to persist in spite of a change in the mode of life. I have had as patients thus affected many farmers and country gentlemen who had suffered since youth, though living with little apparent care or intellectual occupation.

As before mentioned, it may lead to the first form of heartburn; but in symptoms, pathology, and treatment, it may be considered as a transition from it to the next in order. And I shall, therefore, postpone speaking of the indications it affords till I have brought before you the heartburn which arises,

(3rdly.) *By too much acid being formed.* To this the name of "acidity" is applied with propriety, because there really is an excess of acid. It comes on at a period more distant from the time of meals than the last kind, and may be considered, in some respects, as a further stage of it. The pain, however, is much less intense in general, sometimes so slight as to cause scarce any inconvenience. But the regurgitations are much greater; sometimes true vomiting occurs, distinguished by spasmodic action of the diaphragm; sometimes only a teaspoonful of intensely sour liquid comes up, roughening the teeth, and bringing tears into the eyes; sometimes a gaseous acid (acetic and butyric) is belched up spasmodically; sometimes it oozes up gradually, and its presence is shown by the saliva and breath being sour to the taste and smell.

These peculiarities will suffice to distinguish between "acidity" or heartburn from real excess of acid, and those forms previously named where the excess is only apparent. A further test may be found in the action of remedies: a small dose of alkali, a grain or two of soda or potash, will be sufficient to appease them; whereas, in this case, a very considerable dose is required.

Acidity is often misunderstood. I have heard it spoken of as "an excess of gastric juice," "excess of action in the stomach" —that is say, too much of a vital act, too much life. Such a mode of speaking, if it leads to anything, must lead to faulty thinking and bad treatment.

Instead of being an excess of gastric juice, it is itself a proof of deficiency. You may prove by experiments on artificial

digestion, that an increase in the quantity of the solvent secretion quickens the solution of albumen. You will find, for instance, that the amount of pepsine contained in twenty grains of Boudault's powder will dissolve a piece of hard-boiled white-of-egg much sooner than five grains. The same thing would of course happen in the stomach; were there more gastric juice there would be quicker digestion. But in "acidity" such is notoriously not the case; the aliments lie for a long time in the upper part of the digestive canal, and often are, after all, passed undissolved in the fæces. It is a chemical act of decomposition directly opposed to the vital act of digestion.

I call a "vital" act any which forms part of the great circle of life, such as is the conversion in the stomach of albumen, previously incapable of solution and absorption, into peptone capable of entering the circulation. Now, when this vital act of conversion is carried on with rapidity by a stomach making abundance of gastric juice strong in pepsine, then chemical decomposition is prevented; nay, it is even arrested after it has commenced, as may be seen by putrid meat not becoming more but less putrid as it passes through the body of a healthy animal. But when the conversion is slowly or imperfectly performed, then chemical change has time to take place, and does so very soon, being favoured by the heat, moisture, and animal matter in a state of change. If the food remain too long without becoming chyme, the protein compounds putrefy with extreme rapidity under such circumstances.

Compare this white-of-egg which has been immersed in saliva at the temperature of 100° Fahr. for twenty hours, with another portion from the same egg kept the same time in distilled water. Your nose warns you of the difference directly; the first is intolerably fetid, the second quite sweet.

(*Experiments shown.*)

Exactly similar is the fate of undigested albumenoid matter, whether animal or vegetable, in contact with the mucous membranes inside the body. But how does that affect the case of acidity? Thus—I have in this beaker some syrup of grape sugar, quite neutral and natural. Here is some of the same which has been poured on a piece of putrefying albumen a few

hours ago, and kept at the temperature of the body. You see that a piece of litmus paper I put in it is strongly reddened, showing the copious formation of lactic acid. In another beaker, the formation of butyric acid from fresh butter by the same means is shown to you.

(*Experiments shown.*)

Just so all the grape sugar and fat swallowed, when it meets in the stomach or intestines with decomposing animal food, remaining in a mass or glued to the side by a too-sticky mucus, ferments quickly throughout, and forms lactic and butyric acids in great quantity.

Remember, the grape sugar swallowed means something much more important than merely the grape sugar eaten. See this boiled starch; I heat some of it with the potassio-tartrate of copper, and there is no change in the blue colour of the salt. Now I put some in my mouth, and hold it less than a minute.

(*Experiments shown.*)

See! when it is again heated with potassio-tartrate of copper, the metal is precipitated, and shows by its brilliant yellow colour an abundant quantity of sugar. The saliva, you see, begins to convert starch into sugar immediately; very soon it will transform the whole mass. A mouthful of boiled starch which I held in my mouth for five minutes the other day showed afterwards scarce a trace of starch remaining. As, even amongst meat-eating nations, from half to five-sixths of the solid food consists of starch,* it is evident that one of the most bulky contents of the stomach must be the sugar which has been made by the saliva out of amylaceous food. Here then is ample material for the formation of lactic acid to almost any amount. Add to this the oleaginous substances which it is impossible to avoid in any diet, and which, from being insoluble in water, constitute a peculiarly acrid and concentrated acid, and you will have no difficulty in accounting for acidity, without recurring to a theoretical excess of gastric juice. Acidity then is an evidence of

* See the dietaries of soldiers, prisoners, labourers, and others, analysed by Dr. Hildensheim in 'Die Normal-Diät,' p. 6, Berlin, 1856.

chemical, and therefore of decreased, vital action, a proof of incomplete digestion, of deficient activity in the stomach.

On this rests the rationale of the hints for treatment which it gives. The way to cure it *temporarily* is to neutralize by alkalies the excess of acid which is formed. And this may be freely done without fear of bad consequences; for you are not likely by any reasonable dose to make it so far alkaline as to interfere with digestion. It is not in this form, where acid is really in excess, but in the first (or nervous) heartburn that alkalies do harm, for the reasons there stated. Where it arises simply from temporary debility induced by occasional gluttony, "the remorse of a guilty stomach," it may be left to cure itself. But a *permanent* cure can only be brought about by reagents which—

(1st.) Strengthen the local power of the gastric solvent;—

(2nd.) Augment its quantity;—

(3rd.) Excite the peristaltic motions.

The local power of the pepsine secreted, although in diminished quantity, may be much increased by neutralizing the saliva swallowed and collected in the stomach and œsophagus just before the meal. In laboratory experiments on artificial digestion, you will find that saliva arrests the solvent action of pepsine in a close proportion to its amount. In the laboratory you may set the action at work again by acidifying the mixture, unless you have waited so long as to allow it to decompose. So too in the stomach, if you take it in time, you may free the pepsine from the alkaline saliva, and enable it to do its duty by adding acids. The best to select are those to which the viscera are most used, hydrochloric or lactic. A few drops of these taken immediately before meals will almost always have a most beneficial effect.

The quantity of the gastric juice may be increased by supplying one of its most important constituents, water; but in large quantity at the meal it is apt to dilute too much the sparing secretion, and hence it is better to direct the principal draughts to be taken half an hour afterwards. An artificial gastric juice, in the shape of one of the new preparations of pepsine, may also be given if the acids are not sufficient; but I prefer to try at first and get the patient to be his own pepsine

maker. The colder the water the better; for the low temperature acts as a tonic shower-bath to the local nerves, and removes the congestion of the blood-vessels, while at the same time it never quite stops digestion, and soon acquires heat enough to let it go on with full rapidity.*

Your patient will perhaps think that you are blowing hot and cold, or rendering inert your own treatment, by ordering acids at one time and alkalies at another; so you will find it a wise plan to give him a short physiological lecture on the subject, explaining the reason of your procedure. You may explain also that the acids given as medicine do something more than in the laboratory: they stimulate the mucous membrane, and so actually increase the quantity of secretion while they increase its power. You need not have the fear, which I have heard some express, that the use of these substitutes for the natural constituents of the gastric juice, or rather the supply of that which ought to exist in the gastric juice, will teach the stomach to be lazy—as doing a servant's work for him makes him less equal to doing it himself. On the contrary, the new vigour put into the system by the healthier and more copious chyme that is formed, renders the organ more active; so that it soon is enabled to go on secreting for itself what is wanted, and to do without the artificial substitute. Do not, therefore, let patients fancy that they might get into a habit of taking these medicines, so as to be obliged to continue or to increase the dose. If they derive benefit from them, they will be able soon to leave them off.

The action of the peristaltic muscles of the stomach can be excited by most of the drugs which act as purgatives. But unfortunately, in the great majority of gastric complaints, purgatives are decidedly injurious, so that the good done to the stomach is overbalanced by the injury done elsewhere. The least hurtful are rhubarb and aloes; but even they somewhat

* That cold retards the action of the gastric solvent is shown by some experiments on artificial digestion I published in 'The Lancet,' of May 23, 1857. But at the same time it does not stop it. Even the freezing temperature does not entirely do that, as is proved by Drs. Bidder and Schmidt. 'Die Verdauungssäfte,' Exp. ix, 1, 2; x, 1; xvi; xvii. This is a comfort to the admirers of ices.

impede the digestion in many persons who take them as a dinner pill. A better expedient is strychnine. Its small bulk causes it to be quickly absorbed, and to act locally on the stomach alone without affecting the rest of the system; so that where common caution is observed, I have never found it necessary to leave it off on account of the occurrence of specific spasmodic effects; at the same time its beneficial influence is most marked, and in many instances it acts as a bitter tonic also, increasing the appetite and spirits.

LECTURE XLIII.

PAIN IN THE STOMACH.

Local weight, tightness, distension, dependent on excessive secretion of mucus—Gastric catarrh, acute and chronic.

(*Extra course, St. Mary's, Summer Session,* 1857.)

Weight, Tightness, Distension, sometimes a feeling expressed as of being "blown out with wind," while on examination the epigastrium is found not more tumid than that of a healthy person digesting, are modifications of a sensation produced in the nerves of the stomach itself.

(1.) *Alone.*—Where the sensation exists alone, unaccompanied by soreness, by pain on pressure, or by decided pain immediately after eating, it is possible to judge of the real meaning of the phenomenon. But in complicated cases the difficulties presented are very great. Putting aside for the nonce these latter, and looking only to simple examples, I have come to the conclusion that it denotes simply the presence of an excessive amount of mucus in the stomach.

Like other mucous membranes, that of the stomach may be affected *acutely* or *chronically*. The first case may be called "gastric catarrh;" the second, "mucous flux." Both are liable to be followed by vomiting, which relieves temporarily the distress, and which in the acute form constitutes the most ordinary form of "bilious attack," so called from the bile which the action of the diaphragm in vomiting causes to regurgitate along with the contents of the stomach. When not rejected by vomiting, the aliments are so enveloped in mucus, that they cannot be acted upon by the gastric juice, and are passed very

little changed into the bowels, where they are liable to ferment, and by their acidity cause diarrhœa, flatulence, and sometimes a copious discharge of mucus from the bowels. This latter result is more common in acute than in chronic cases, where the motions are often infrequent and irregular, and exhibit unformed or scybalous fæces.

When vomiting occurs, the ejected matters are mixed with so much mucus that there is no difficulty in making the diagnosis; but where it does not, the case is liable to be mistaken for one of disease of the bowels, on account of the flatulence and mucous diarrhœa. Certainty of diagnosis can in such cases be obtained only by the administration of an emetic, which brings the source of the evil into the light of day.

In acute cases this excess of mucus is often accompanied by very intense headache, but in chronic it seldom goes beyond a feeling of stupidity. Flushing of the face, and heat at the back of the eyes, are also nervous symptoms dependent upon the chronic condition, and seem quite independent of any disturbance of the circulation.

"Acute catarrh of the stomach," like all other catarrhs, is excited by external, and often by epidemic influences. Changes of temperature are its most frequent cause But still, as in other catarrhs, the cause must have a special reason in the individual for selecting one mucous membrane rather than another. And since the naturally warm position of the stomach, aided by the usual habits of dress, guard it very efficiently against ordinary variations of the weather, the idiosyncrasy of the individual has a preponderating influence in its production, and often leads the others to be overlooked. But in the prevention of the complaint more is to be done by attending to these special reasons, and by protecting the stomach against such deleterious agents as the habits of the patient expose it to, than by trying to alter the diathesis of his body.

On the other hand, the mucous flux is much less dependent on external circumstances, and much more on organic changes either in the stomach itself or some other viscus. Tubercles in the lungs, emphysema, chronic bronchitis, and enlarged heart, oftenest produce it, and it is associated with cancerous, tubercular, and inflammatory affections of neighbouring parts, but

alone it is rare. In this it resembles bronchial flux or chronic bronchitis.*

(2.) *With soreness on pressure,* more especially if the soreness exist also when the stomach is empty, or if accompanied by a decided pain arising from the ingestion of food, it denotes that the secretion of mucus depends on some local inflammation or ulceration of a chronic character in the mucous membrane. Where a tumour can be felt, the probability is that it is of a cancerous nature. Where there has been bloody vomiting, the diagnosis of ulcer, cancerous or non-cancerous, is almost certain.

I incline to think that the peculiar sensation just described depends on the general state of the mucous membrane, and not on the local injury to one part or another of the stomach. My reason for thinking so is that it is capable of so much relief by medicines even in patients where the spot anatomically altered is found afterwards to have been gradually progressing. Some of you may remember a man who lay in Albert Ward during the greater part of a year, with rapidly growing cancer of the liver and pylorus. In spite of a continuous increase of his necessarily fatal tumours, the sense of distension and weight after food diminished, the patient rarely vomited his meals, and was able to eat largely. His being able to take a large quantity of nutriment much prolonged his life, and his illness on the whole was not one of much distress. So you see that the treatment

* In 25 post-mortem instances of excess of mucus adherent to the walls of the stomach—

6 had tubercles or vomicæ in the lungs as chief cause of death;

4 had diseased hearts as chief cause of death;

7 had œdema pulmonum or emphysema observed after death, or chronic cough observed during life, as chief causes of death.

In the above 17 it may be considered as self-evident that there was an increased secretion of mucus from the bronchi as well as from the stomach.

Of the remainder—

4 had diseased kidneys as chief cause of death;

1 pneumonia (in both of which chronic cough was not unlikely);

1 had cancerous; and

1 tubercular disease of the peritoneum;

1, a child of four months, had acute inflammation of the bowels, and the mucus was an evidence of gastric fever, not of chronic flux.

(See 'Digestion and its Derangements,' by the author, p. 353, with the references to Dr. Jones' paper.)

of even necessarily fatal cases is capable of adding much to the comfort of our fellow-men, and is well worth the thought and attention of a serious mind.

It may be observed, that where distension with soreness is dependent on local inflammation of the stomach, the pain is constant, at no time entirely absent, though increased by the ingestion of food. You may see a well-marked case followed out in 'Case-book' xxxix, p. 424 (where the complete cure seems to show that there was no ulceration), and several others scattered through the books and indexed as "hæmatemesis" (where the throwing up of blood seemed to indicate that lesion), in all of which the discomfort is described as never quite wanting.

The excessive secretion of mucus in the stomach, whether arising from ulceration of the membrane, from chronic inflammation of it or neighbouring parts, from adhesion of the peritoneum restricting the peristaltic movements, from simple degenerative thickening of the secreting structure, from cancer, from external pressure (as in the case of cobblers or tight-laced women), is indicated by the sense of distension above named. But the evil rarely stops here. The gastric juice that is poured out cannot penetrate the slimy layer that envelopes, as in a bag, the mass of aliment, which consequently ferments and produces all the evils arising from chemical decomposition in the stomach. And if the solvent secretion could get to them, it would be neutralized by the alkali of the mucus, and so rendered incapable of dissolving albumen. Hence heartburn and acidity arise, as before explained; and hence, in some constitutions, vomiting, in others a passage of the fermenting mass into the bowels, and diarrhœa.

Mucus itself appears peculiarly incapable of being digested. When children with catarrhal coughs swallow their bronchial secretion, you may often find it unaltered in the stools. If you try to dissolve it in artificial gastric juice in the laboratory, small lumps undergo no change after several days. Still more, when the extensive surface of the stomach secretes a large adherent mass of a peculiarly stringy and firm description, it is often passed in large quantities through the bowels, and induces a suspicion that some part of the latter organs are the seat of the evil. And in truth the diagnosis is not easy. The best

guide to it is the observation of the contents of these masses of mucus—if you find enveloped in the glairy slime merely brown granular matter, hairs, threads, the cellular tissue and husks of plants, bits of gristle or skin, bile, or anything developing the natural smell of fæces, then you may fairly conclude that the mucus comes from the bowel; but if there are bits of food uncoloured by bile—if, instead of smelling like fæces, they are putrid, or exhale an odour like vomit, it is certain that some, and probably the greater part, of the mischief lies in the stomach. Thus you see that the digestive function, in the cases we are now considering, is "painful" and "imperfect," but by no means necessarily "slow;" indeed, in many cases, the little digestion that goes on is performed with too great quickness.

The indications for treatment derived from a mucous condition of stomach are as follows:—First, it must be remembered that it is not only the evidence of disease (like the flow from the nose in nasal catarrh, for example, which does no injury after it has once flowed out), but it is also the cause of further evil, and therefore it must be directly restrained by astringents.

Secondly, the place of the patient's own gastric juice, which cannot get at the food, must be supplied by artificial solution of the aliments, and their decomposition must be prevented.

Thirdly, alterative diet and medicines, and local counter-irritants, must be used to relieve the congested or degenerated state of the organ at fault; especially in cases complicated with pain.

Of astringents, I have found none act more directly than kino; and where there is pain at the cardiac extremity of the stomach, heartburn, or pyrosis, the conjunction of opium with it, as in the pulvis kino compositus of the pharmacopœia, increases its efficiency. Larger doses of opium, however, in quantities sufficient to produce soporific effects, cause headache. A good test of the extent to which it is desirable to give astringents, may be found in their action over the bowels. Whilst doing good, they cause no constipation; and in some instances even relieve that symptom by removing the general state of irritability and discomfort, and by checking the discharge of mucus; so that it may be made a rule to continue them only so long as they do not constipate the bowels.

Nitrate of silver is a very powerful astringent. But it is of no use unless you prevent the salt from being decomposed and converted by the chloride of sodium of the mouth into the inert chloride of silver. The best mode of securing it is to cover the pill thickly with gelatine, so that it remains undissolved until it gets to the right seat of action.

The sulphate of iron is also a very valuable astringent, especially in anæmic cases. I have found it a good plan to commence with the nitrate of silver; and, when obliged to leave that off for fear of turning the complexion black, to commence the iron, and continue that until complete re-establishment of health. Ferruginous waters, especially those containing the sulphate (such as the Moffat and Hartfell chalybeates), or any others where the metal is made into sulphate by the addition of a few drops of sulphuric acid, will, of course, be equally beneficial—indeed, often more so from the addition of change of air and scene.

Another form of iron which I have found very useful in gastric cases, is "iron alum;" but I cannot detect any difference in its action from the ordinary copperas above recommended.

Gallic acid is also useful, if a variety of astringents is required. But, to say the truth, I have been unable to detect any advantage which one medicine of this sort has over another, and think the only use in having a long list is to be able to ring the changes upon them, to prevent the patient wearying of uniformity.

The arrested solution of the aliments may be partially compensated for by a diet of milk guarded from coagulation by lime-water, so as to postpone its digestion to the intestines. The avoidance of such articles as are apt to form a solid mass will do much; and for this reason pastry, new bread, and hard meat, or fish, must be strictly proscribed. But the most complete substitute for the patient's own natural secretion, is pepsine artificially prepared. It enables solid albuminous food to be taken without distress, increases the appetite, and raises the strength. In the milder cases, lactic acid, taken before food, is sufficient.

The most efficient agent in preventing the decomposition of albuminous food (evinced by fetid evacuations, acidity, &c.) is

sulphurous acid combined with soda. There are two forms of this salt, the sulphite and hyposulphite. Of these, the former contains most sulphurous acid, and certainly does the work required of it most readily. But then, it has the bad quality of completely destroying the potency of gastric juice at the same time, so that while you are preventing the chemical decomposition you are also preventing the vital digestion. The hyposulphite has not this pernicious effect, and may also, from its less nauseous taste, be given in larger doses, so that by its means you are able to do the good without the harm.*

By "alterative" diet I mean a restricted supply of nutriment, so that the destruction of effete tissues should somewhat exceed the supply. This for a short period seems beneficial in cases where there is an organic change in the tissue of the stomach itself. But the treatment must not be carried too far: a week is, perhaps, the extreme period to which the starving system should be carried; if it does not do the good expected in that time, it never will.

The same cases are benefited by counter-irritants, such as leeching, blistering, and long-continued water-dressings to the epigastrium. The advantages of the first are, that their application is soonest over, and gives relief most rapidly, while at the same time it does not prevent the use soon after of the other local remedies. The fear that this little loss of blood will lower the patient is theoretical; for the increased power of digestion adds twice as much blood and flesh as the leeches can suck away. In 'Case-book' No. li, page 223, you will find the case of a patient of mine who was leeched on the epigastrium for some time every other night, yet gained twenty-one pounds in weight during her six weeks' stay in the hospital, so great was the relief afforded in her form of indigestion. The advantage of the wet compresses as a counter-irritant is, that they do least harm, though at the same time it must be confessed that they do least good, and are scarcely adapted for severe cases. However, in the milder, especially where the person is not so ill as to be kept from ordinary business, this method of accomplishing your object is very convenient.

* See "Experiments on Artificial Digestion," by Dr. Chambers, in 'The Lancet' of the 23rd of May, 1857.

The use of mercury is beneficial just in about the same degree as the alterative diet above mentioned: immediately it has begun to have any good effect it must be left off, or it will begin to do harm. It is excellent as an inaugurator or introducer of good, but it does not carry it on without the evil results showing themselves. The utmost care must be taken that it does not specifically affect the system, or purge. As a universal rule, purgatives, and especially mercurial purgatives, do harm.

"Oppression" is often complained of at the same time with the weight, tightness, or distension at the epigastrium. But it means something more, and is by no means identical. Indeed, in those worst cases of mucus on the stomach, which relieve themselves by vomiting or by rapidly passing on with the alimentary mass, there is no oppression at all. On the other hand, there are frequent instances of much discomfort where the patients do not at all assent to the description of a weight at the pit of the stomach. That is a purely local feeling, referred, in a former part of this lecture, to the local nerves; whereas this indicates a general feeling of morbid lassitude and physical incapacity throughout the whole body. There is a confusion of ideas, sometimes an unnatural sleep, sometimes faintness, irregular nervous action, such as flushings of the face, palpitation of the heart, fidgets, twitchings, or cramp.

As I said before, these are often the accompaniments of gastric mucous flux, but at the same time they often exist without it; and, indeed, almost anybody may bring them on by getting very tired and then eating largely. If vomiting occurs, you see no mucus in the egesta, but simply the food last taken unaltered in quality or appearance. Digestion is more than slow, it has completely stopped.

Oppression shows an exhausted condition of the muscular and nervous system of the stomach. The peristaltic motion is null from want of power. The causes usually are those which exhaust the nervous energies without stimulating the powers of life, such as prolonged and severe intellectual labour, annoyance of mind, and overstrained attention. Temporarily, and in persons previously disposed, mere corporeal exertion may bring it on; but this form of depression usually works its own cure, and does not become a chronic habit; for the excessive bodily

toil either causes a reactive stage of increased nutrition, or so much exhausts the voluntary muscular system that it cannot be continued.

This view of the pathology of the disorder obviously suggests the appropriate treatment, which is, to tone and invigorate the involuntary muscles of the stomach. I have found no remedy do this so invariably as strychnine. Should anæmia be present, iron—if heartburn, acidity, or waterbrash be joined, then bismuth can be added; but where the symptom named exists alone, or predominates above the others, still more, if bark, iron, or other tonics in any way disagree, nothing affords such satisfactory results as the alkaloid principle of nux vomica above named.

WEARING OR BORING PAIN commences gradually soon after food; it is confined to the epigastrium, or extends itself over the abdomen, and does not run up the œsophagus like heartburn. It sometimes is relieved by vomiting, and if not, continues with more or less intensity till the stomach empties itself through the pylorus. The pain is increased by pressure, very often not immediately, but in the course of a minute or two, as if the sluggish sensation of the part took some time to appreciate the injury.

Boring pain is nearly always sufficient to rouse a suspicion of ulceration; even cancer does not cause it, so long as the mucous membrane be whole. The suspicion is strengthened if weight and tightness of epigastrium be present to indicate the excessive secretion of mucus which usually accompanies chronic ulcer; and the diagnosis is further confirmed by the occurrence of bloody vomiting.

It can seldom be removed by internal remedies. Those which do it most good are bismuth, opium, and kino; but counter-irritants to the external surface of its seat, leeches, blisters, continuous poultices, mercurial and opiate inunctions, are of much more marked benefit.

It is in these cases especially that the failing organ requires to be spared work. The best dietetic substance is milk made alkaline with lime or soda-water, given in small quantities as frequently as possible. Next to that, a mouthful of mutton chop at a time, with a dose of pepsine to digest it. Meals are

painful, your patient tells you, so advise none to be taken, but a continuous sparing supply of such food as may pass through the stomach without distending it, and be digested by the small trickling of peptic juice which there is in the stomach and bowels. The chief object of the lime-water is to prevent the milk forming a large curd, but it also may be a sedative to the raw surface, just as it is to a blistered or burnt skin.

Cramp or spasmodic pain in the epigastrium appears to arise from the pyloric sphincter. It is often accompanied by cramps in the neighbouring and remote muscles, thus affording an indication of the tissue in which its seat is to be looked for. It occurs chiefly in old persons, during the latter period of the stay of the food in the stomach, and does not show any organic disorder of the part. A moderate dose of an anæsthetic stimulant is the best mode of relief: the domestic remedy of a thimbleful of brandy with two drops of laudanum is about the most efficient that can be administered.

LECTURE XLIV.

ERUCTATION AND VOMITING.

Anatomy and physiology of Eructation—*Relaxation of œsophagus—Spasm—Analyses of gases by chemists—Deductions therefrom—Secretion of air by mucous membrane (?)—Defective absorption—Decomposition of food—Fermentation prevented by acidity—Classification of morbid states in which eructation occurs—Indications of treatment in the several classes—Antacids—Astringents—Valerian—Ammonia—Sulphurous acid—Charcoal—*Vomiting*—Causes of—Indications afforded by the contents of the vomit—Remedies for—Hydrocyanic acid—Carbonate of magnesia—Opium—Chloroform—Leeches—Lime-water and milk—Brandy—Creasote—Valerianate of zinc—Ice—Possibility of starvation from vomiting of a purely functional character—Sea-sickness and its remedies.*

(*Extra course, St. Mary's, Summer Session,* 1857.)

Eructation is the passage upwards through the œsophagus of air contained in the stomach. It must be remarked that the gaseous contents of the hollow viscera are differently circumstanced from the liquids and solids; their great expansibility by heat, and their low specific gravity, give them an inherent force which enables them to find their way out without any aid from the muscular system. There is no fluid so light but it requires the action of the expiratory muscles to expel it from the stomach, whereas no gas is so heavy but that, when warmed by the body, it will not rise through the œsophagus directly that tube is relaxed.

The first condition of eructation is the relaxed and open state of the cardiac end of the gullet. The air, instead of being retained by the natural contraction of this powerful sphincter, finds its way upwards in greater or smaller quantity. The passage of the bubble towards the mouth almost always, except in completely paralytic patients, causes a reaction, and by the time it gets to the fauces it is compressed by the stimulated muscles, and expelled with considerable force. Hence the noise is greater than is caused by the mere bubbling of air up the gullet, such as you produce in moving a dead body. There is a compound of relaxation and reactionary spasm, the former taking the initiative.

The analyses of the gas contained in the stomach, by Chevreul and Chevillot, show that more than four fifths of it is atmospheric air and the rest carbonic acid in much less proportion than in the breath which is passing out of the mouth by expiration.* So that we have clearly not to seek far for a source of the air; it is evidently swallowed with the food and saliva in the great majority of cases. Some persons also have a trick of half-consciously swallowing air, like crib-biting horses, especially when suffering from some uneasiness in the digestive organs; and in the paroxysms of sobbing, of hysteria, and of epilepsy, large quantites are gulped down. And it is not impossible that gas might be secreted by the mucous membrane, though I am not aware of any case that proves the occurrence.

Another morbid condition that helps to produce the flatulent collection of gases is defective absorption. In health gases are very easily absorbed by the alimentary canal. It is the normal thing for the abdomen to be dilated during digestion with several pints of air, which disappear in a short time without passing upwards or downwards. To be convinced of this fact is exceedingly easy, by observing the extent to which the parietes of the belly are distended and the descent of the diaphragm is impeded, so as to shorten the breath, after even a light meal of only a few cubic inches of victuals. In an hour or so the dis-

* See a comparison of the different gases of the alimentary canal as analysed by Chevreul, Marchand, and Chevillot, in the author's work on 'Digestion and its Derangements,' book i, chap. ix.

tension has all gone, without making any sign of sudden departure, in a healthy person. But in an invalid body absorption is not so active. The gas normal to digestion is not taken up, and remains to disturb the patient by its continued presence. Should the œsophagus be in its natural state—that is to say, equally contracted throughout—the aërial contents of the stomach may be passed on through the pylorus, to produce, perhaps, the state of flatulence, which will be considered in a future lecture. Should that tube be relaxed, then they break upwards in eructations.

So far, the bulk of air swallowed has been supposed to be increased only by heat and expansion. But in some cases it is further augmented by gases disengaged from the decomposing organic matters of the food. The occasional occurrence of the alcoholic fermentation in the digestive canal is proved by instances of vomiting, in which the matters ejected are seen actively undergoing this chemical change. They are frothy and tumid, continually swelling up and throwing off bubbles of carbonic acid, like yeasty beer. You have lately seen a man in Cambridge Ward in whom this condition of the ejecta was very conspicuous. Half a pint of vomit, left to stand, soon frothed up and ran over the edge of a vessel holding two quarts. You can easily imagine what a disturbance in the stomach all this frothing and boiling must make, and are not surprised at the rejection of such a turbulent guest.

Fortunately the spread of alcoholic fermentation through the saccharine contents of the stomach is a rare occurrence. Its features are so marked, and the discomfort it causes is so great, that we should hear a great deal more about it were it common. The fact is, that even where it begins and gives rise to the disengagement perhaps of some carbonic acid, it is rapidly stopped by the conversion of the sugar into lactic acid, which is more congenial to the temperature of the body. So that the "acidity," which in a former lecture has been spoken about as an evil, is the guardian against a still more serious evil.

It will be easily seen, from what has gone before, that the morbid states of which eructation is a phenomenon, naturally arrange themselves into three groups—(1) where there is simply a relaxed œsophagus, (2) where there is an increased quantity of

atmospheric air swallowed, and (3) where foreign gases are formed from chemical decomposition.

In the first may be included many cases of heartburn. The quantity of air brought up is small, but it seems to relieve the discomfort, probably by its stimulating the painful organ to contract—just as moving a cramped limb cures the spasm. It may be observed that these cases are made much worse by motion. I have been told by several patients that if they kept quiet after a meal they experienced scarce any inconvenience, whilst exercise at such a time invariably brought on eructations, hiccough, and heartburn. Sometimes the eructations are the most prominent symptom, and the heartburn is very slight.

Under the same category may be classed cerebral diseases of a paralytic kind, where the partial loss of power in the œsophagus frequently causes eructation.

In these instances the eructations usually occur very soon after meals, and have very little explosive character.

In the second group come hysteria, epilepsy, and chorea. Watch a patient in an hysterical or epileptic fit, and you will see great gulps of air bolted down. In chorea, too, you may often detect by the eye or touch the involuntary spasm of the gullet, which gulps and swallows whether any solid matter is present or not. There is often, too, at other times, especially in hysteria, a spasm of the œsophagus, well known as globus hystericus. And less marked manifestations of the same phenomenon, uncomplained of by the patient, or called simply "heartburn," occur constantly during the day, and fill the stomach with air.

The excessive swallowing of air is often associated with a large or dilated stomach,* but I cannot satisfy myself whether it is cause or effect; I am inclined to think the latter, for the follow-

* In 13 cases of dilated stomach which I have noticed—

3 had gastric cancer (St. George's post-mortem book);
2 had chronic ulcer (ditto);
2 had dropsy and diseased liver (ditto);
1 had ulcerated œsophagus and distorted ribs (St. Mary's post-mortem book);
1 has a pendulous tumour attached to the pylorus (alive);
3 have very fat omenta dragging down the stomach (alive);
3 have albuminuria (alive).

ing reason: you find these dilated stomachs principally as the result of some mechanical pressure or drag on the organ from without, and therefore I do not know whether repletion from within alone would cause a permanent increase of area, more especially repletion with a substance so easily got rid of as air; while, at the same time, it is easy to imagine that a large, heavy empty stomach, dragging upon the cardia, should give rise to an instinctive gulping.

In this class of cases, the explosions of air occur at various times, but most markedly and most inconveniently immediately on swallowing food or drink. The air thrown up has little or no taste or smell.

In the third group, where the gas is really generated in the alimentary canal, the eructations occur much later after eating —sometimes not till the time when, normally, the stomach ought to be empty; and if they do come close upon the meal, they continue much longer, and do not give the apparent relief which is experienced in the other cases.

The gases thus eructated are nauseous and fetid, sometimes with the odour of sulphuretted hydrogen.

In these cases, there is almost always mucous flux of the stomach, sometimes from anatomical changes in some part of the organ, sometimes without. The rationale appears to be, that organic matters in a state of decomposition remain adherent in the mucus, and act as ferments to the newly received food. Perhaps too, the mucus itself may decompose. You know how quickly that takes place in urine, and how soon its decomposition is communicated to the rest of the fluid in or out of the body; and the same is likely enough to happen in the alimentary canal. The decomposition of the mucus is confirmed by the frequency with which different sorts of low organic growths (moulds) are found in it. The cryptogam sarcina ventriculi is the most distinctly marked of these, and, though detected occasionally elsewhere, certainly finds its most congenial home in the stomach. In other places it has been found a floating wanderer in fluids, but in the mucous membrane of the stomach it may be seen fixed and growing in the mucus. It is not often that an opportunity occurs of proving to the eye that such is the habitat of the sarcina—we frequently find it vomited, but the

patients seldom die during their illness, the complaint not being a fatal one. One such rare opportunity offered itself two years ago, in a girl of thirteen, who died in this hospital of enlarged heart. She had frequent attacks of mucous vomiting without sarcinæ a few weeks before death, and at the autopsy we found the seemingly healthy great curvature of the stomach thickly clothed with a stringy mucus, very difficult to detach, in the outer layer of which a great quantity of sarcinæ were imbedded.

Being fixed thus in a permanent home, as shown by the above-quoted rare case, and rapidly replacing with new growths those which are wiped away by the food, the sarcinæ is, unfortunately, by no means idle. A great number, perhaps all, of those cryptogamous plants whose nature is to grow upon decomposing organic matter, have the property of promoting decomposition, so that they are not only the consequences, but the causes also of decay. It is found that the gutta-percha covering to electric-telegraph wires, when laid down near the roots of oaks, becomes rapidly rotten from the presence of a fungus peculiar to that tree. Put jam in a new cupboard, and it will keep much longer than in an old one, where mould has previously grown. Economical housewives have sometimes what they call a "vinegar-plant;" it is, as I show you here, a fungoid vegetable found in vinegar casks. If placed in sugar and water, it makes the whole undergo the acetous fermentation in two or three weeks, instead of the process occupying several months. The mould found in yeast, the torula cerevisiæ, though not essential to alcoholic fermentation, certainly augments the rapidity of its induction; so that it is entirely in accordance with known physical laws if the presence of sarcinæ, or of the yeast-plant, on the mucus of the stomach should bring on fermentation in the food before the obstructed absorbents have time to take it up. Both have been found in the contents of the stomach ejected; and it is shown by the case I quoted, that sarcinæ at least may exist adherent to the mucus without being thrown up. Probably very often these plants are unseen promoters of the rapid fermentation which takes place so mysteriously in the stomach of invalids.

Besides producing eructation, the fermenting of organic matters in the stomach is almost always followed by vomiting;

while, if it takes place in the bowels, the consequence is diarrhœa; two phenomena which will be considered shortly in their own place.

The indications of treatment afforded by eructation, are different in the three groups of cases in which it occurs. In the first, antacids are often sufficient for temporary relief. Four grains of rhubarb-pill, with a grain of gallic acid, taken before dinner, will be found still more useful, for the tone thus given to the mucous membrane prevents the recurrence of the inconvenience. In more severe cases I have found a rhubarb draught with gallic acid, taken three times a day, a very efficient remedy.

In the second group, where excess of air is swallowed, valerian and ammonia are very beneficial. Where there is nausea or vomiting, the valerianate of zinc may take their place; but it is not so certain as the infusion or tincture of the herb. Where this fails use strychnine, which you have seen in the wards to be the most powerful agent we have to steady such irregular nervous action as hysteria, chorea, &c.

In the third group, the great object must be to prevent decomposition. In the laboratory you find that no agent is so powerful in this respect as sulphurous acid; and, accordingly, it is much used in various processes of the arts for the purpose. Sulphur is often burnt in casks to arrest the fermentation which is apt to be going on in the liquids soaked up by the cracks or porous parts of the wood, and the sulphurous acid vapours effectually do their duty. The Board of Health finds no disinfectant for fetid sewers so instantaneous in its action as Macdougal's, the chief ingredient in which is sulphite of lime. Meat may be prepared on the same principle, and keeps as well as when salted or dried; and you may test even on such a delicate substance as yolk of egg how fresh it keeps with any sulphite salt. The same effect is produced by taking as a medicine hyposulphite of soda; the fermentation of the contents of the stomach is arrested, and the evil effects of that fermentation prevented.

Another powerful arrester of chemical changes is charcoal. When soup has begun to turn sour in hot weather, clever cooks boil it again with a little bag of charcoal in it, and it becomes quite sweet. The same agent will prevent decomposition in the

alimentary canal. I have used it, I must say, only in cases where decomposition occurs in the intestines, producing flatulence; but I should not hesitate to employ it in gastric fermentation also, if hyposulphite of soda chanced to disagree or was not beneficial.

Vomiting seems less than any of the phenomena previously discussed dependent upon the peculiar condition of the stomach, and more upon the idiosyncrasy of the individual. There are those who, whatever may be the matter with them, never vomit; whilst others do so on the slightest occasion. Even pleasant associations will, in some people, bring on this most unpleasant consequence: a patient of mine, a healthy young lady, is frequently seized with retching on entering a ball-room where she expects an agreeable evening; whilst it never happens in going to a stupid party. On the other hand, I have had patients with cancer of the stomach, and others with various sorts of severe dyspepsia, who could take the most nauseating drugs without inconvenience. The mere fact of vomiting, therefore, affords in itself no clue to the local condition of the stomach. But the time of its occurrence, the circumstances which increase it, and the nature of the matters thrown up, may be most suggestive to the practitioner.

Vomiting which occurs when the stomach is empty, or which, though it occurs at other times, is most frequent and distressing then, may be safely set down as arising not from any fault of the viscus itself. Such is the morning vomiting frequent in pregnant women, in cases of diseased heart, of abdominal tumour, and sometimes of pulmonary consumption. This is no doubt a reflex action of the vagus nerve excited by the irregular irritation of some of its branches; and on the same principle I can easily understand the more rare cases where vomiting has been caused by foreign bodies in the ear or nose, by tumours in the neck, &c.

When vomiting occurs with a replenished stomach, it may be considered as a general rule that the smaller the quantity of food that produces it, and the sooner it takes place after eating, the nearer to the mouth is the seat of injury. Disease of the œsophagus causes rejection of the food before it has got down; of the cardia, or smaller curvature, very soon after it has got

down; and disease of the pylorus, or pancreas, or liver, after an interval sometimes of as much as several hours.

When vomiting arises from congestion of the brain, as in apoplexy, drowning, concussion, or in dead drunkenness, it is increased by the horizontal posture; when it arises from deficient supply of blood, as in fainting, anæmia, and sea-sickness, that position relieves it.

The contents of the vomit, which can afford practical suggestions to the practitioner, are the following:—

Mucus, if it is in large stringy masses, shows a generally diffused morbid condition of the stomach itself; if it is in small round lumps, it has most probably been secreted from the bronchi and swallowed.

Blood, when it comes from an open vessel perforated by an ulcer, always is in considerable quantities, and contains black clots; if it is mixed up with mucus, brown and shreddy, it denotes a high state of congestion of the gastric walls, with rupture of some small capillaries, or what is commonly called "exudation."

Saliva, readily distinguished by its alkalinity, and the abundance of buccal epithelium contained in it; when in large quantities, it denotes an irritable state of œsophagus and fauces; when it constitutes the bulk of the vomit of pregnant women, you will often find associated with it a sort of salivation in the mouth.

Fæces or *fæculent smell*. This is usually referred to a reversal of the peristaltic motion; but I do not think it necessary to resort to such a strained explanation. When we reflect that about twelve quarts of secretion are daily poured into the intestines, it is easy to see that you have only to stop the onward peristaltic wave and absorption, for the ilia to get overfilled, and for their contents to overflow upwards into the stomach. There they naturally produce vomiting, just as they would if swallowed. Such a paralysis of muscles and absorbents takes place in peritonitis, as well as in mechanical obstruction of the ilia, and consequently in peritonitis you have sometimes fæculent vomiting.

Fermenting matters in the vomit show the continuous retention in the stomach of some remains of the food or of vegetable

growths in a constant state of chemical change. There is therefore present a quantity of adherent mucus capable of retaining them there.

Acid matters in excessive amount may arise from a similar state of things; but it seems as if simple torpidity of stomach, without the necessary presence of mucus, can occasion it.

Pure unchanged food shows that the vomiting arises from the state of the nervous system, which is either locally irritable, from neighbouring anatomical changes; or secondarily, as in pregnancy; or generally, as in hysteria.

The remedial measures which I have found most useful in cases of vomiting are the following:—

Hydrocyanic acid, where it arises not from any fault of the stomach itself, but from the secondary condition of the nervous system, as in pregnancy, diseased heart, and abdominal tumour, in pulmonary consumption, in peritonitis.

Carbonate of magnesia, in the vomiting accompanying gastric flux, with copious formation of acid.

Opium, in acute vomiting from gastric ulcer, from malignant tumour, in fæcal vomiting from perforation, peritonitis, internal hernia—in short, wherever the vomiting is accompanied by much local pain.

Chloroform, in the vomiting at the commencement of fevers. It may be applied either on a cloth to the epigastrium, especially in choleraic vomiting, or taken by the mouth.

Leeches.—Very often the vomiting in cases of gastric ulcer will not be appeased till some leeches have been applied to the epigastrium.

Milk and lime-water, as a sole diet, will often alone stop chronic vomiting. Complete rest and absence from excitement must accompany its use.

Brandy, in teaspoonful doses, is a favourite domestic remedy. It is suitable in acute cases for the nonce, and will often stop nervous vomiting from mental causes, but is obviously not adapted for chronic disease.

Creasote.—This is an uncertain remedy, and I confess I cannot at all satisfy myself what cases it is suited to. The vomiting certainly seems checked by it sometimes, sometimes is aggravated, more commonly is uninfluenced. The cases where it has done

good have appeared to me generally dependent on nervous causes. For example, it has been beneficial in hysterical vomiting.

Valerianate of zinc I tried once in hysterical vomiting with good effect. But in these patients the most powerful remedy is the *shower-bath.*

Ice is often most useful in acute vomiting in fevers, in chronic cases of gastric ulcer, and in all cases is an agreeable remedy in warm weather.

The administration of food in cases of chronic vomiting is a matter of much importance. You must not let your patient be starved. Even when milk and lime-water does not check the vomiting, it is by far the best diet. In teaspoonfuls at a time, it can almost always be kept down.

The risk of being starved to death from vomiting is not an hypothetical fear. A young woman came under my care at this hospital a few months ago who had been deserted by her lover. She had violent hysteria, and an utter inability to keep anything on her stomach for some days; the pulse was failing, and the tongue getting dry and brown. An attempt was made to retain life by means of nutritive enemata, but in vain. At the post-mortem examination every organ was in a completely normal state, and the catamenia were still flowing from the uterus. She had died of starvation only.

When sea-sickness goes to the extent of making a person seriously ill, it is worth while to stop it or prevent it, as you can often do by a large dose of opium. But it is very far from being worth while for healthy persons, or even invalids, in ordinary cases, to take this preventive; for a small dose is useless, and the requisite large one makes the patient endure much more discomfort afterwards than the sickness during the voyage would have caused. Chloroform does not arrest the nausea, but it certainly does seem to control the violence of the straining. Effervescing stimulants are the most effective palliative for healthy persons. In some rough rolling weather off the coast of Portugal I once tried on myself and several companions champagne and highly devilled biscuits with complete success. But the panacea is not always accessible; the best imitation of it generally at hand is frothy bottled porter: if it does not in every case prevent the vomiting, yet the prostration afterwards

is avoided, and the ejecta are not so disagreeable as when they consist only of bile and acid mucus. Warmth is also very important: landsmen will often expose themselves as much as possible to the breeze, thinking that the freshening air will revive them and keep them well. This is a great mistake; they should clothe themselves as warm as possible, put a flannel band or faja round the waist and abdomen, and above all things keep dry and quiet, and when they feel miserable, go and sit with their backs to the funnel.

LECTURE XLV.

DIARRHŒA.

Pathology of diarrhœa—Difference of it from mere frequency of evacuation—Division of diarrhœas—Bilious—Watery—Muco-purulent—Bloody—Putrid—Their causes and indications—Supplementary and reflex diarrhœa—Infantile—In Fever—Ulceration of bowels—Mucous flux—Copious solid matter—Acid diarrhœa—Use of opium—Riding—Cautions about travelling—Flatus in ilia—Charcoal, &c.

(*Extra course, St. Mary's, Summer Session,* 1857.)

When the absorbing power of the intestines is defective, the consequence is an excess in the *quantity* of matters which pass through them; that which ought to be taken up is carried along with the normal draught, and so constitutes a true diarrhœa.

It is of great practical importance to distinguish this from the mere frequency of evacuation, which is quite consistent with a natural or even deficient amount of fæces. The number of motions, or the number of times an inclination is felt to void them, is often increased when less than the average quantity may be passed in the twenty-four hours. This is of the nature of tenesmus, and arises from an abnormal state, sometimes ulceration, sometimes piles, sometimes cancer even of colon or rectum; whereas true diarrhœa, as aforesaid, depends upon defective function of the ilia.

The arrest of function, as declared by the prevailing contents of the stools, constitutes the best principle of division; and according to it we may speak without being misunderstood of *crapulous, bilious, serous, dysenteric diarrhœa,* and *cholera.*

Crapulous diarrhœa is simply an excessive quantity of food taken, or arrested in its normal solution by suspension of the gastric function. It is called crapulous, because it is most usual after a debauch; but in weakly persons it is not necessary that the intemperance should be absolute; that which is moderation for others may be an excess in them. An examination of the fæces exhibits a quantity of undigested food as the prominent feature, sometimes acid, sometimes fetid and fermenting, and rarely with enough bile mixed with it to prevent decomposition.

Bilious diarrhœa is the next simplest form of the disorder. Bile, normally poured out by the liver to the extent of from three to four pints a day, if not concentrated by the intestinal absorption, adds very largely to the quantity of excrement, where its presence is declared by its well-known smell, and by a colour exhibiting various shades of yellow, brown, and olive-green, according to its absorption of oxygen and mixture with fæces.

This arrest of the absorbing powers of the intestines and consequent rejection of bile mixed at first with fæces, and when the bowels are emptied augmented by the exudation of water from their parietes, is what so often takes place temporarily from the impression of cold, from irritation of the alimentary canal by unwholesome food and from mental emotion. It is possible also that the qualities of the bile itself may be altered in some cases, or its quantity increased. It may be changed by medicines, as by calomel or by senna, and so rendered incapable of absorption, and be poured through the ilia without their being in fault. Congestion of the portal system, such as is especially frequent in Europeans resident in warm climates, causes the bile to be at one time deficient, and afterwards to be poured out in excess. Irritation of the stomach and duodenum causes it to be retained in the liver and gall-bladder till it is unfit for absorption. In both these cases it is rejected by the bowels and constitutes bilious diarrhœa.

You must be very careful to distinguish this symptom from a different one, often confounded with it—viz., the presence of a bright grass-green matter in the stools. This is not bile at all, but in reality altered blood, and denotes congestive inflammation of

the mucous membrane, a state requiring very opposite treatment from that proper for bilious diarrhœa. Your best aids to diagnosis are first, the smell:—in real bilious stools the odour of the hepatic secretion can always be perceived, in spite of the fæces mixed with it; and at the same time it always prevents putrescence, or even counteracts the incipient putrescence of the undigested aliments; while in the grass-green stools the smell is not of bile, but more or less cadaverous or putrid. Secondly—the microscope exhibits in the mucus, which always is present in congestive inflammation, the usual globules of pus mixed with small shreds of fibrine and blood-globules.

In *serous or watery* diarrhœa it is probable that there is an increased exhalation of aqueous fluid from the blood-vessels of the intestines, as well as an arrest of its absorption. In this form, when pure, if the fæces are retained by a voluntary effort, they may be concentrated nearly to their normal condition by the removal of the water, and thus a test afforded that their state depends mainly on the addition of this constituent. For that which can be so readily taken up again into the blood cannot be of a nature very foreign to it. Thus, for instance, if you take a saline purgative, you may feel several pints of fluid rolling about in the bowels; but if you resist the inclination to stool, it goes off at last, and you void afterwards little more than the ordinary amount of semi-solid fæces. It is not so in bilious or inflammatory diarrhœas.

Watery diarrhœa, when not arising from the anti-osmotic action of neutral salts, indicates a congested state of the venous plexus of the alimentary canal, and a consequent morbid proneness to exhalation and deficiency in absorption. The vitality of the mucous membrane is deficient; and if it is not restored, local death, exhibited in the form of ulcers and sloughs, must be the result.

The exhalation, however, tends to become habitual, and so continues beyond the period of congestion, so that the whole mass of blood is relieved of its water, and in this way sometimes dropsical swellings may be re-absorbed and pass off through the bowels.

In *dysenteric* or *muco-purulent* diarrhœa, water is in excess, but the characteristic is the presence of mucus or pus mixed

with it; in which also there are, in cases seen early, shreds of fibrine, blood-globules, and flakes of the peculiar epithelium of the bowels.

Should any of these products of inflammation be alone, separate and unmixed with fæces, then it is probable they come from the colon or rectum; but if they are mixed up with a large quantity of watery fluid, and still more, if that watery fluid shows itself to be the serum of the blood by coagulating with heat, then there is little doubt of their source being the mucous membrane of the ilia, whose morbid condition it consequently indicates. The fluid in muco-purulent diarrhœa is always highly alkaline, and if it is examined with the microscope, crystals of ammonio-magnesian phosphate are found scattered through it. If allowed to stand, it separates into two distinct parts: the one *serous*, varying in colour from complete whiteness and transparency through all the shades of yellow to deep brown, or where blood is present, to red and black, in which are the flakes of fibrine, the ammoniacal crystals, and floating globules; the other *sedimentary*, consisting principally of gray, granular matter, the débris of food mixed with more or less of the colouring matter of the bile and half digested blood.

The degree of serosity and the proportion of the products of inflammation in the first, show the extent to which inflammation has gone in the mucous membrane; whiteness, bloodiness, putridity, alkalinity, being bad signs; yellowness, opacity, the smell of bile, and the absence of putridity, being good.

The second, or sedimentary portion proves the condition of the general system rather than of the ilia in particular. If it is copious in proportion to the fluid, then the normal function of destructive assimilation is shown to be little interfered with; if it is scanty, then we know this important process to be arrested, the effete morbid tissues are not being removed from the body, and a more grave state of affairs exists. The quantity of solid sedimentary matter is the best test you can have of an advance towards health, or departure therefrom, in all cases where there is this state of bowels.

The most common examples of muco-purulent diarrhœa are found amongst acute diseases, in low fever, in cholera, enteritis, and dysentery, especially in the teething dysentery of children.

Amongst chronic diseases, ulceration of the bowels, whether a consequence of phthisis or low fever, is the most usual cause.

Bloody diarrhœa, where the blood is in small streaks in the mucus, or slightly mixed with the serum, or mixed with the grass-green mucus above described, indicates a recent inflammatory state. When it is in clots, either black or fibrinous, with the globules partially washed away, it shows that a blood-vessel of notable size has been opened into, probably by ulceration. Should pus be mixed with it, the diagnosis of ulceration is confirmed. Black, semi-digested blood, precipitated by standing with the sediment of fluid stools, comes from high up in the alimentary canal, as it indicates its exposure to the gastric juice. It not unfrequently comes from the stomach itself.

Putridity of the stools in diarrhœa always shows that there is an imperfect quantity of bile in them, one of the most clearly ascertained functions of the hepatic secretion being to prevent the chemical decomposition of albuminous matters. Putridity may arise from two sources—namely, the food taken, or the albuminous secretions into the alimentary canal. A close examination of the stools will generally distinguish one from the other. If it is non-digested food which is decaying, then the solid constituents of the fæces are bulky, pale, containing large lumps of still paler substance visible to the naked eye. And if these are examined by the microscope, they will be found to consist of muscular fibre, fat, and other parts of victuals, often swarming with live infusoria and vibriones. This occurs from time to time in all cases of deranged digestion. If the fetor arises from the decomposed albumen of the exhaled serum, it will be observed to be exhaled from the more fluid part of the motions, which are like the washings of macerated flesh, while the solid part is scanty and comparatively unaffected. This shows a much more serious state of the vital powers, and in severe complaints, such as low fever, is usually the harbinger of death. It is often joined to a peculiar mouse-like smell in the sweat.

In *choleraic* diarrhœa the whole mass of the blood is poisoned, and it is so altered in its physical qualities that very little of it remains capable of supporting life, or of absorbing the wherewithal to support life either in the shape of food or medicine. The functions of the liver and kidneys are suspended for want of

live blood, no bile appears in the stools or vomit, no urine in the bladder.

For the purpose of understanding clearly the degree in which life is deficient in the different forms of diarrhœa, we may construct a table in which the first column is occupied by the several functions, the loss of one or more of which characterises those different forms. It will be seen that the sign of minus may be placed against one after the other till the normal condition of all is finally lost, as an essential, not accidental, part of the disease.

Full life.	Crapulous diarrhœa.	Bilious diarrhœa.	Serous diarrhœa.	Dysenteric diarrhœa.	Choleraic diarrhœa.
1. Blood healthily sufficient for the support of the whole system.	1. Normal.	1. Normal.	1. Normal.	1. Normal.	1. — (Mass of blood poisoned and half dead primarily affects the whole system.)
2. Coats of capillaries elastic and retentive of the contained blood.	2. Normal.	2. Normal.	2. Normal.	2. — (Coats of capillaries wanting in elasticity, becoming congested and ruptured, let out the blood. The other stages of inflammation may or may not follow.)	
3. Exosmosis and endosmosis of serum through the mucous membranes equal to one another.	3. Normal.	3. Normal.	3. — (Exosmosed serum passed away by stool, instead of being reabsorbed.)		
4. Bile made in full quantity; its fluids reabsorbed by intestines, and its coloured solids only rejected per anum.	4. Normal.	4. — (Constituents of bile not absorbed, but passed away, forming the bulk of the dejections, and shown by the smell to be unaltered.)			
5. Food fully digested.	5. — (Undigested materials of diet passed away with fæces, and hurrying downwards the bile and other contents of the intestines.)				

In some instances of mucous flux and indigestion in the upper part of the alimentary canal, the stools are acid from time to time. There is nothing special in the pathology of this. It arises simply from so much acid being formed from the decomposition of food, that it cannot be neutralized by the alkaline juices. Sometimes the acidification takes place in the stomach, sometimes in the cæcum, during the delay of the decomposing aliments there. In the latter case considerable pain is often experienced in the right iliac region, and in the course of the colon just before the evacuations.

In all forms of diarrhœa from affections of the small intestines the evil is twofold: first, the aliment, which ought to contribute to the support of the system, is hurried through the abdomen, and so the supplies are cut off; and secondly, destruction is carried on at an increased rate by exhalation from the mucous membrane of the bowels. The stick is being cut away at both ends, and hence there is nothing which produces such rapid emaciation. Where so called "diarrhœa" is reported to you as lasting for any length of time without emaciation, always let your suspicions of the correctness of the nomenclature be roused, and observe carefully whether the quantity of excrement be really in excess, or whether the ailment have not rather the nature of tenesmus, and arise from the colon or rectum. You will generally find such to be the fact, and must vary your treatment accordingly.

Sometimes diarrhœa seems to be the transference of a tendency to exudation of serum from another tissue to the alimentary canal. Such is that which sometimes comes on of its own accord or may be artificially induced in ascites, and which certainly diminishes the abdominal effusion. Such is the diarrhœa of uræmia, which, however, does not usually relieve anarsarca, but rather increases it from the weakening of the blood which follows. Hence it is a very bad, almost a fatal symptom in the latter disease.

The most important indication of treatment is connected with the diet. It must be such as does not require a perfect state of the digestive organs for its absorption, while at the same time it is nutritive to the patient. The best of all is milk and lime-water. In feverish cases it may be iced, and soda-water may be

occasionally substituted for the lime. Keeping a person solely on this diet is often sufficient alone to cure all sorts of diarrhœa not dependent on a permanent chronic cause; and even where there is such a cause for it, very great temporary benefit is derived, which forms a better starting-point for medicinal treatment than the previous state.

In a temporary diarrhœa without other disease the loss of the normal supply to the body is not of so much consequence, a short starvation perhaps does good to a person otherwise healthy. But in severe acute disease, or in long-continued chronic diarrhœa, this is an important consideration, and care must be taken to allow for it. Since food in the usual quantities at once cannot be borne, and is rejected undigested, give it very frequently and in small portions. The alkaline milk diet I have just recommended allows this to be done most conveniently. A jug of the liquid may be kept close at hand, and sipped from time to time, so that as much nutriment may be taken in the twenty-four hours as would be done by a healthy person without the alimentary canal ever being overloaded.

When there are lumps of fæculent matter in the stools, and a smell like that of normal excrement, give purgatives. Until you get rid of these remains of previous constipation, you will be sure to have a relapse of diarrhœa, though your medicines may check it for a time. When there is no normal smell present, I have never found purgatives beneficial. This is a better rule than the routine practice of always commencing the treatment with a purgative—a plan which I have known very injurious in cases of chronic diarrhœa.

Where the products of acute inflammation are found mixed in the stools, such as white and opaque mucus, flakes of fibrine, epithelium, blood-streaked mucus, bright green matter, &c., as above described, leeches, fomentations, warm hip-baths, and poultices to the abdomen, are the appropriate treatment, and should not be delayed. In the case of babies, the whole abdomen and loins may be fastened up in a large circumambient poultice, which they cannot wriggle away from, a leech put on near the navel, and the bite allowed to bleed for a little time. The drugs I have most trust in are calomel, ipecacuanha, and carbonate of soda. Of the first and second equal quantities, and

a double quantity of the third, may be made into powders, of which from four to six grains, according to the child's age, may be given every three hours. This is a traditionary powder, but it is right to say that I have in a good many instances lately left out the calomel, and the case has done just as well if not better without it.

Be very careful in infants to look to the teeth. The state of the bowels may very likely be dependent on reflex irritation from the dental nerves. Lancing the gums will sometimes stop a most violent diarrhœa where the stools show evident proofs of the inflammatory condition of the ilia. The action of the lancing is probably much the same as that of leeches, viz., a relief to the congestion of the mucous membrane. Upon the development of the teeth themselves it can hardly be supposed to have any influence, but that it alleviates toothache any adult can experience on himself, though it is difficult to get an account of the action of the remedy from his little patients.

In teething infants opium is of striking utility. I begin with half a grain of Dover's powder every three hours, increasing the dose by half a grain every three hours, till a decided excess of sleepiness is produced by it.

But there is no doubt that the most important cure in infantile diarrhœa is change of diet. Bringing up by hand or an unwholesome state of the breast-milk are generally at the bottom of the ailment. No remedy is equal to a healthy wet-nurse, or, where circumstances forbid that, as near an imitation as can be made of human milk by that of animals. The old-fashioned donkey's, or the cow's diluted and slightly sweetened.

In low-fever the presence of diarrhœa indicates to many practitioners the employment of mercury in the form of mercury with chalk. The effect of this drug is the increase of solid sedimentary matter in the stools; in other words, a restoration of the destructive assimilation going on in the body. The motions are diminished in number and in fluidity, but not in actual quantity. Thus the tissues devitalized by the typhoid poison are removed, and can be replaced by new nutriment. This increase of solid matter is taken as an evidence and test of benefit accruing from the use of mercury, and as a prognosis of good. But I confess I prefer the chalk without the mercury in

the shape of mistura cretæ or the employment of mineral acids.

Where in the absence of fever blood is passed by the bowels, the two most powerful means of checking it I have found to be turpentine and acetate of lead, especially the latter. Its direct influence as a poison on the bowels would have led to an expectation of this. If the hæmorrhage has gone on for some time, I am inclined to think it must be sometimes due to a clot distending the bowel, and preventing it contracting upon the bleeding spot, for certainly a dose of castor oil, in the results of whose action a quantity of pale clots were exhibited, has several times in my experience stopped hæmorrhage from the bowels.

The long continuance of diarrhœa from ulceration of the ilia must starve the patient. It tends also to prolong itself; for the weaker the system is, the more irritable are the sore places, and the less can the morbid actions they set up be resisted. It is right, therefore, to use direct means for arresting the diarrhœa. The best are such as blunt the sensibility of the ulcerated spots. The milk-and-lime-water diet should be used first, then chalk and opium, which appear to act on the sore mucous membrane just as they do on a raw blistered surface of skin. If these fail, sulphate of copper should be used in doses increased from a quarter of a grain up to two grains. If no good accrues after this, I suspect an error has been made in the diagnosis.

Where there is a simple flux of transparent mucus without fever, pain, or pressure, or any fibrine or blood in the motions, the vegetable astringents, such as logwood, bark, kino, and tannin, are often of great use. In such cases, too, I have prescribed iron with seeming benefit. I must, however, say, that I feel doubtful in the great majority of instances whether this form of flux is not rather due to the colon than to the small intestines.

Where the solid matter is copious, pale, and fetid, consisting mainly of undigested food, inspissated bile may be given with benefit; the stools become darker, less fetid, and less frequent under its employment. This is particularly the case in children whose mesenteric glands are diseased. I am hopeful, too, that pepsine will prove a still more efficient remedy in the same cases, as it certainly diminishes the fetor of the motions in the

best way—namely, by promoting the normal solution of the food.

Acid diarrhœa indicates the free employment of chalk.

The use of opiates in diarrhœa must never be made a matter of routine. As a general rule, I have found them beneficial without consequent harm, in cases where there was tenesmus and frequent stools; but where the fæces are bulky and copious they appear to impede the natural secretion. Where the stools also are putrid, caution is required in their use. In the diarrhœa which so often accompanies and proves fatal in uræmia, they check, indeed, the debilitating flux, but they are apt to bring on coma.

In some cases of diarrhœa from chronic mucous flux of the intestines, without ulceration or acute inflammation, I have found horse exercise serviceable. I suppose it is the gentle agitation of the abdomen, combined with the air and amusement, that proves of use.

In recommending the recreation of travelling to invalids subject to diarrhœa, you must be very careful of the route you select. The epidemic influence of cholera which has overspread Europe during the present generation, visiting almost every square mile of its surface several times during the last few years, has in many places left behind it a chronic endemic poison. The natives are, indeed, insensible to it, but few strangers escape becoming affected more or less, according to their idiosyncrasies. Strong persons find it only an inconvenience, but an invalid is put in some danger, and certainly loses all the advantage of the tour. This is especially the case in the mountainous districts of the south of France, the Pyrenees, and Dauphiny, and in the volcanic regions bordering the Rhine, the Eifel and Moselle country, as well as those in the centre of France, the ancient province of Auvergne. All these places are attractive from their picturesque beauties, and therefore it is necessary that you should be warned of this evil attendant upon choosing them as the scene of a tour. You will see sometimes the whole of the strangers at a table d'hôte obliged to leave the room at once, and cause one another no slight inconvenience by tending all together in the same direction; and in the Pyrenees I have seen powders of chalk-and-opium packed up as the regular concomitants of a

day's walk. It must not be supposed that this is the result of the foreign modes of cooking. I have known English biscuits and porter, and boiled eggs, adopted as a diet without relief, though of course nothing foreign could have got into them. I believe the cause to be as I have represented it—namely, a poison left endemic since the passage of cholera through the country, but to which the natives have become acclimatised. That it is of late years only that this diarrhœa has been prevalent is shown both by local report and the omission of all mention of it from the well-known work on "Climate," by Sir James Clark.

One source from which strangers contract this diarrhœa is an evil capable of, and rightly demanding, amendment: I refer to the filthy privies in continental inns. A gentleman, eminent in his profession and of good judgment, told me that, during a Pyrenean tour lately, he entirely escaped the diarrhœa which everybody else without exception suffered from, by adhering to a strict rule of never entering one of these disgusting holes, but worshipping Cloacina under the pure light of the stars. Invalids and ladies cannot so well manage this unless they are rich enough to travel with carriages and servants and peripatetic water-closets. With few exceptions I think patients with diarrhœa had better stay at home.

Flatus in the small intestines is one of the most troublesome forms of wind. If it escape into the stomach, which is fortunately rare, the taste and smell are peculiarly nauseous; whilst it seems to have considerable difficulty in passing the ilio-cæcal valve. Hence it rolls about in the abdomen from the changes in position which the motion outwards of the alimentary masses involve, and causes the well-known and distressing "borborygmi," till it can get absorbed. The abdomen will often be distended for several days with it, without its being able to escape.

The persons most liable to this troublesome affection are fat anæmic and hysterical women; it follows also the small and contracted liver of spirit-drinkers, and sometimes is very annoying in cases of dilated heart. Some persons, in apparent health, are habitually much troubled with it. I am inclined to attribute it under these circumstance to a naturally sluggish

portal circulation, which does not so quickly absorb the contained air as a freer current through the blood-vessels would enable it to do.

Flatus in the intestines is troublesome during the day, from the tumidity of the abdomen, and noise on motion, and pain in the side; but when it comes at night it causes still more inconvenience by preventing sleep. I cannot explain why this is; there is not enough pain or discomfort to account for it, yet a complete wakefulness and apparent want of desire for sleep commonly prevails. It is to be remarked, also, that it is in most instances made worse by opium. Sometimes the patient will go to sleep easily and naturally on first lying down, and will then wake up in an hour or two, finding his abdomen tumid and uncomfortable, and will remain entirely without rest for the remainder of the night; or if he drop off for a few minutes into unconsciousness, it seems rather to aggravate than relieve the feverish restlessness, and to cause headache.

The most serviceable remedy is finely-powdered animal charcoal, in doses of from ten to twenty grains, and of the aloes-and-myrrh pill just enough nightly not to act as a purgative. The air seems to be absorbed, and the peristaltic motions quickened, by this treatment. Should that not be effectual, you can employ strychnine in small doses in the pill.

It is scarce needful to say that indigestible articles of diet must be shunned, if the patient would avoid a recurrence of the complaint; and it stands to reason that cold sponging and bathing, sea-water—and in short all hygienic remedies which improve the general health—will conveniently accompany the treatment.

I have known two cases of habitual looseness of bowels cured by marriage. In one of these the change was sudden and immediate: a gentleman from boyhood to the age of thirty-five had been used to have the bowels opened at least five times a day; a week after his wedding the number of evacuations was reduced to two, and before the year was out to one daily. I presume it is requisite for the marriage to be a happy one—a Xantippe would not, probably, lead to the same soothing result.

LECTURE XLVI.

COSTIVENESS AND CONSTIPATION.

The difference between costiveness and constipation—Costiveness dependent on retained excernible matter—What diseases it accompanies—Cause, defective vitality—Effect on the nervous system and mind of retained excernible matter—Indications of treatment—Inconveniences of purgatives—Sort of purgatives to be adopted—Dietary—Water—Watering places—Cautions in use of them—Hydropathy—Constipation—Causes—Irritating food—Unabsorbable food—Remedies—Flatulence in colon—Distinguished from that in ilia—Remedies—Slight cases difficult to relieve.

(*Extra Course, St. Mary's, Summer Session,* 1857.)

The opposite states to diarrhœa are "constiveness" and "constipation." In the former the quantity of fæces is too small; in the second, the expulsive power is in default.

Costiveness arises from deficient excretion into the alimentary canal. What proportion of the matters that ought to be thus got rid of comes from the liver we have not yet the means of knowing, but the main point, that they are derived from portal blood, we are justified in asserting; so that the solution of the former question is of the less importance.

That a great deal of the colour of fæces is due to bile is familar to us from the phenomena attendant on obstructed gall-ducts. But even when there is complete occlusion of the communication between the liver and intestines, the fæces by no means consist entirely of undigested food; there is in them

a great proportion of a yellowish-grey granular matter which appears also in the healthy state, and still makes up the bulk of the solid excreta.

In deficiency, therefore, of the excretive powers of the intestines generally (*vulgo* "costiveness" or "biliousness,"), there is a different substance retained than is the case when local lesion of the liver or gall-bladder obstructs the passage of bile. There is a partial retention of the whole matters destined for depuration from these quarters, instead of a complete retention of one constituent.

Hence there is not, as happens in mechanical retention of the bile, the well-known stain of jaundice communicated to the blood and skin, nor are the stools clay-coloured. But there is a dinginess and darkness of complexion, and the stools are scanty. The skin gets greasy and opaque, the countenance sometimes puffy and bloated, sometimes thin and pale, the lower eyelid especially sallow and discoloured. The sebaceous follicles on the alæ nasi are stopped up with black matter.

There is seldom any decided emaciation, nor is there always even loss of muscular power; but still there is great sluggishness of body and apathy of mind, and often a miserable want of decision and energy. Digestion is accompanied by a good deal of discomfort and flatulence, but rarely by actual pain, and the distress does not begin till several hours after eating, so as to be with difficulty referred to any particular meal.

In the least complicated cases of checked intestinal secretion the stools are dark, hard, and dry; but their appearance may be varied by several circumstances. Sometimes there is an augmented secretion of mucus, and then they are intimately mixed up with it, forming a black, slimy, almost gelatinous mass. Sometimes, from the appetite not suffering, the patients will eat largely, and then there appears irregularly from time to time a quantity of fetid, semi-digested food, constituting a sort of diarrhœa accompanied with pain and colic. And this diarrhœa will often be the occasion of your patient's first coming to you, so that you might be deceived into a false impression of the case.

The congestion of the portal vessels in the upper part of the alimentary canal is often followed by the same state in the lower,

and thus piles are formed, which add much to the general distress.

Costiveness is a common accompaniment of anæmia, chlorosis, debility in males and females, or diseased hearts especially where the muscle is dilated rather than hypertrophied, of contracted liver, and in short, of anything which makes the abdominal circulation sluggish. Sometimes it is found in cases of pulmonary tuberculosis, but hardly ever before middle age. All those pulmonary cases in which I have seen it last long enough to be a marked feature have been examples of senile phthisis. It is often the first and most characteristic phenomenon of that change of system which takes place in females after the cessation of the catamenia. The stools get gradually more and more scanty as the uterine secretion also diminishes, the pulse grows feebler, the feet and hands more liable to get cold. There is evidently lessened vitality throughout the whole body.

No persons more frequently suffer from costiveness and its attendant "biliousness" (as the general appearance of the skin is named) than old Indians. Their sedentary routine life and high feeding are partly chargeable with their liability. But in addition to this, the endemic diseases of the country are often the exciting cause. I have traced the commencement of a costive habit of body several times distinctly to an attack of dysenteric fever brought on by malaria. So that the Anglo-Indian who suffers in this way must not be always accused of previous excess.

The natural end of this state of things, if left unchecked, is gradual progress from bad to worse. The decrease of destructive assimilation loads the tissues with effete matter, useless for the purposes of life, and a constant source of general discomfort. This impedes the constructive assimilation of food as well—growth is arrested, the blood is not renewed, and hence progressive anæmia, weakness, want of nervous and muscular power, and probably in the end the degeneration of one or more of the viscera, and death from that cause.

One very striking attendant on the loss of destructive assimilation, is the depression of spirits; melancholy is so named from the dark, scanty stools which were observed by the Greeks to be associated with it. It appears to me to be a universal rule in disease that the general discomfort is proportioned to the arrest

of this vital process, and I am inclined to attribute it almost entirely to the influence on the nerves of general sensation of effete matter which is retained. In all maladies, both acute and chronic, you may observe the truth of this law. Mark, for instance, the ushering in of a fever: the malaise is excessive; there are pains in the back, in the head and the limbs, or, in milder cases, a sense of what the patients graphically call "all overishness;" but when they get worse, and destruction begins, the effete matter passing off as urea and increasing the specific gravity of the urine,—then no aggravation of local symptoms, however much it may alarm their physician, and make his prognosis graver, prevents the general feeling of relief. Or watch a case of consumption; the deposit of tubercle may be insignificant, and is at all events in its first stage; yet the patient is despairing of recovery. Why? Because the skin is sluggish, the bowels costive, the urine of low specific gravity; because, in short, there is evidence of the retention of effete matter in the system. But let this patient's tubercles soften, let there be night sweats, copious expectoration, diarrhœa—everything that prophecies ill—and who so full of hope as the poor blind sufferer? Morbid states where destruction is in excess are the most fatal, but those where retention preponderates are invariably the most distressing.

Costiveness must be regarded as a disorder of the whole system, and not of the intestinal canal alone. The only effectual remedies are those that are advised under that conviction.

The objects of treatment must be: first, to relieve the body of the immediate presence of effete matter; and, secondly, to prevent artificially its reaccumulation till such time as a complete renewal of the tissues has taken place. Then the body ought to be able to take care of itself, and a cure may be said to have been performed. The attention to local disorders, arising from the successful study of morbid anatomy, has too much made us forget this main object of all medical advice—the replacement of morbid tissue by healthy. "*Renew* my age," was the chief earthly blessing prayed for by the inspired prophet; and physiology teaches us it should be the motto of the rational physician; for if he omits to rebuild the healthy, his care for the destruction of the unhealthy is all thrown away.

Purgatives, then, may very fairly begin the treatment; for the immediate relief they give to the feelings of discomfort is great. But let not that relief be set down to the mere "clearing out of the bowels;" it is the cleansing of the blood which is the real object of the remedy, and the real cause of the relief. An inspection of what comes away shows you it has been newly formed; it is fresh bile and other natural constituents of recent fæces; not of those which have rested long in the canal.

Nothing is easier than thus with a vigorous blue-pill and black draught to drive away, as with a charm, the patient's discomforts; and he is ready enough to cry out that no more medicine is wanted. But what is the consequence of leaving off treatment? The renewal of the blood and tissues not having had time to regain its original activity—there not being enough new-made blood to carry on vigorous life—the effete materials again collect, and the disease takes a fresh starting-point. Again and again the coarse expedient is called for, and at last fails to effect its object of giving relief.

To avoid this evil consequence it is best to give no quickly-acting complete purgatives which directly deplete the abdominal plethora by serous exudation; but rather such as cause a gradual increase in the solid matter of the stools. Aloes and rhubarb are the best of these; and I find it also beneficial to combine with the drug resins which act as a tonic to the surface of the mucous membrane, and prevent the exudation of serum and mucus. Four grains of aloes-and-myrrh pill, every night, will in a week produce all the good effect of strong purgation; and it will produce the good permanently instead of merely for a time.

All accessory food that has the property of arresting destruction must be left off. Wine, beer, tea, and coffee, must, on this account, be excluded from the dietary; and milk, cocoa, whey, soda-water, Seltzer-water, &c., substituted for them.

Perhaps it is on account of their temporary arrest of destructive assimilation, that general tonics, such as cinchona and quinine, rarely agree well in those cases. I find it better to give pure bitters, such as oak-bark, quassia, and gentian, which seem to act chiefly on the mucous membrane. Their use is to increase the appetite; and, when that object is attained, I

leave them off; or, if it is attained without them, I do not begin.

Water is a very accessible remedy, and certainly a very rational one, when the destructive assimilation is deficient. The conclusive experiments of Dr. Böcker and of Dr. Falck,* show the increase of all interstitial metamorphosis by this agent to be in close proportion to the quantity taken within certain bounds; and all who have heard or read of the agreeable sensations experienced by patients during the water cure cannot doubt its power of removing morbid accumulations of effete matter in the tissues. In this lies its strength; for, as Dr. Böcker observed, "the demand for new tissue, as expressed in the sensation of hunger, keeps pace exactly with the extent of the metamorphosis." And if this demand is rightly supplied, the result must be a complete renewal of the body.

The testimony of experience to the use of water as a remedial agent, is shown in the patronage bestowed from the earliest times upon numerous springs whose saline constituents are even less abundant than those of ordinary drinking-water. Pfeffers, historically famous for freeing Martin Luther of his demon-haunted hypochondriasis, is still the resort of the invalid. It is situated is a most gloomy hole; and the copious hot stream that boils out of the rock is almost chemically pure. So really the pure nymph of the fountain, innocent of salt, should have the whole credit. The same may be said of the well-known Gastein and Wildbad, the crowded Baden, imperial Plombières, of the French Aix, and our own long-frequented Buxton; for, practically speaking, the influence of the saline particles they contain must be reckoned for nothing. It is certainly nothing compared with the effects of moderate doses of water in Dr. Böcker's experiments.

As physiologists we cannot be surprised at the benefit derived from the simple expedient of drinking water beyond the demands of thirst, in all diseases of arrested metamorphosis. Taken several times a day between meals it is a most efficient remedy. Warm hip-baths are also of great use, and can be borne even

* See 'Digestion and its Derangements,' p. 217; and 'Zeitschrift der K. K. Gesellschaft der Aertze zu Wien,' April, 1854; and Vierordt's 'Archiv.,' i, p. 150, 1853.

from the first by those reduced to extreme anæmia and lifelessness. Afterwards, the cold sponge-bath preceded and followed by friction to the skin is a most active promoter of life in the skin and capillaries. The raising the specific gravity of the water by the addition of salt prevents the chill which fresh water is apt to impart. So that even persons with cold hands and feet, and very great sluggishness of circulation, can bear to be sponged with brine.

Alkalies and neutral salts have the same action on the moulting of effete tissues that water has. Hence the repute of many really strong mineral wells. But care is needed lest the same result should follow their use which is threatened by the unguarded use of purgatives. In cases where there is pure arrest of metamorphosis, without organic change in any of the viscera, I find that the weaker the spring the better it is for the patient. Where, however, any organ is chronically degenerated, general consent seems to sanction even such waters as Vichy and Selters, with their large amount of alkaline constituents.

While pulling down an old house, remember to be building up the new. Let full supplies of albuminous material be continuously kept up in such form as the absorbents love. Let milk, mutton, and bread be the staple diet, with the smallest quantity of anything else that human gluttony will submit to. If your patient be one of strong mind, the best and bravest thing is for him to carry out your advice himself. He will then have gained a victory, not only over the flesh, but over the spirit. But if he is no Epictetus, and cannot attain to the dignity of being his own gaoler, do not be afraid of sending him to an hydropathic hotel. You will generally find the proprietors of these establishments willing to carry out your directions, and the situations of most of them are judiciously chosen for the advantages of air and amusement. The principle of scientific hydropathy, the renewal of the body by water and food, the increase of growth secondary to the increase of moulting, is no quackery. It is not an underhand mode of doing nothing, but a *bonâ fide* use of a powerful agent.

I know that medical men are afraid that in sending patients to water-cure establishments they may be aiding and abetting the pretensions which ignorant proprietors have put forth, of their treatment being a panacea for all ailments. In my opinion

a contrary effect would follow; for the very fact of regular practitioners adopting the re-agent as remedial, will show that science ranks it as a physical power; that, consequently, it will do as much harm in some cases as it does good in others; in fact, that, like all medicines, it will kill as well as cure. This is indeed the truth, and patients are as unwise to prescribe it for themselves, or on the advice of an hotel-keeper, as they would be to take arsenic or strychnine, or to cut their legs off, on the same grounds.

CONSTIPATION is often added to costiveness, but is not necessarily connected with it. In it the fæces collect in some part of the abdominal canal, and give proof of that collection by being occasionally passed in considerable quantities at a time. In the stools there are portions more dried and concentrated than the general mass—scybala of various sizes and shapes, dark brown or black, and usually with less smell than ordinary fæces.

The most obvious cause of constipation is mechanical obstruction, the nature of which, under various forms has been fully explained to you in the ordinary courses of medical and surgical lectures.

Simple atony of the colon presents a much more frequent and more curable cause. And not rarely a mucous flux of the stomach or intestines will originate constipation by enveloping the fæces in a slimy coat, and preventing their being moved on by the muscular contractions of the gut. Atony of the colon arises primarily in those who lead a sedentary life, and have that pale look which characterises weak muscular fibre. It is more frequent in the old than the young; indeed, a diminished propulsive force in the large intestines may be considered as a normal consequence of advanced age. It is very usual in convalescence after acute fevers, and other debilitating diseases. Neglect of the natural call to evacuate the bowels, and the retention of wind in the colon, also produces this sort of torpidity by too long-continued dilatation. Hysteria and nervousness in either females or males often spasmodically contract the rectum, so that the fæces are kept unnaturally back, and thus the same state of things arises as from neglected evacuation. The irritation of piles occasions a similar result.

Where there is a disposition in the colon to be atonic, this

disposition is much aggravated, and sometimes first made evident, by some kinds of diet more than others. It is a mistake to suppose that indigestible articles of food "irritate," as it is called, the bowels; that is, pass on quicker than more soluble substances. The contrary is the case; and, as a general rule, the gradual and regular transmission of the mass is in direct proportion to the completeness of its digestion. No sort of food is so apt to be followed by constipation in atonic persons as that which contains a large amount of matter incapable of being acted upon by the digestive juices, such as the husks and stones of fruit, stringy half-cooked vegetables, in which, besides cellulose, there is the equally impracticable body, unbroken starch. All substances capable of being squeezed into an impenetrable mass, such as puff pastry and new bread, come under the same class of insolubles; and perhaps, too, gum and gelatine are liable to the same imputation.

The most successful practice in simple constipation is the free use of cold water enemata, and a long-continued course of small doses of strychnine. When there are no piles, the latter medicine may be advantageously combined with aloes. This treatment does not forbid the administration of tonics, or whatever else may be needful to relieve the disease in which constipation occurs; which disease of course requires to be removed before the local symptom will be free from risk of relapse. It is scarcely necessary to say that no treatment will avail if the bad habits which have induced the constipation are persisted in.

Where the constipation arises from mechanical impediments to the movements of the bowels upon one another, such as adhesions of the peritoneum, contraction from old ulcers, from past inflammation, or compression of the area of the gut, such as arises from tumours, from retroversion of the uterus, and the like, a more soothing treatment should be adopted. Then the enemata should be warm, and have an ounce of olive oil added to them. If there be localized pain, dissolve some opium in the oil, and put some leeches to the spot outside corresponding to the seat of pain. Hot fomentations and poultices containing fresh laurel leaves also give great relief.

The depending position of the cæcum makes it the commonest seat of fæcal collections; and if you find it difficult to fix on

any other spot, it is wise to take it for granted that this is the failing one, and direct your local application accordingly.

Do not be satisfied with the one or two very copious stools which will follow your efforts; the treatment must be persevered in until the bowel has recovered its tone, or there will be great risk of relapse.

Flatulence in the Colon may be distinguished from that in the small intestines by the percussion, by the absence of borborygmi, and by its frequently passing freely out *per anum*. It is a very usual accompaniment of constipation, and in that case has the same pathology, being to the air what the other is to the solid fæces. If the flatulence is a very marked symptom, a carminative, such as extract to rue, or a few drops of ether, may be added to the enema.

Milder cases of colonic flatulence, without marked constipation, are often found more difficult of cure than the severer. The reason is simply that which applies to all of the less inconvenient forms of disease—namely, that patients will not take the trouble to be well unless under strong compulsion.

LECTURE XLVII.

DIETETICS.

Thesis of Dietetics based on the principle of sparing the weakest part—I. Stomach—II. Intestines—III. Increase of absorption—IV. Delay of absorption—V. Gradual return to normal diet.

(*Extra Course, St. Mary's, Summer Session,* 1857.)

As a contribution towards clearing away the mistiness of our clinical dietetics, I purpose to set before you in one lecture certain theses which are my guides in this matter, and perhaps therefore may help you also.

The leading idea of the first-placed and most important rules is simply that of sparing weak members—working those that can work and resting those that cannot.

I.

When the stomach is off work, spare it, and leave the digestion as much as possible to the intestines.

This applies to cases of weight and pain after eating, heart-burn, acidity, hæmatemesis, vomiting of unaltered food, and fermentation. Should the conjunction of symptoms enable us more definitely to diagnose gastric ulcer, mucous flux, cancer, or any other more definite anatomical change, the application is all the more imperative.

Spare the stomach both its *mechanical* and its *chemical* toil.

The first is the hardest, and therefore the most necessary to

be avoided. A meal—that is, the laying in of victuals to avoid future rather than present hunger—is a labour, even to the healthy; so do not impose it on a sick stomach. In very bad cases, do not divide the daily allowance into meals* at all, but assign such quantity as appears enough for the twenty-four hours, and let the taking of it be spread over the whole time, as equally and with as short intervals as possible. In milder cases it will be sufficient to "*spoil*" the meals—that is, to take food between the usual times, so as to leave neither the necessity nor the inclination for eating at once as much as other people. One would be sorry to recommend to the healthy an over-care for their diet, but to invalids subject to gastric derangement, you cannot do better than advise an imitation of a famous centenarian witness, examined by the scientific judge, who said he attained his great age by always "eating before he was hungry, and drinking before he was dry."

But take care that your patients do not spoil their dinner and eat it too: that last error would be worse than the first. Make it a rule that the slightest sense of repletion is to be a warning to desist.

Another valuable expedient for sparing the organ, in cases of slight indisposition, is dilution of the meal. Copious watery drinks carry the food on quicker through the pylorus, and give great relief to over-sensitive, irritable stomachs. But at the same time it must be remembered that thus the time for the action of the gastric juice is shortened, and its chemical strength lessened, so that more is given for the intestines to do. It is better, therefore, to let this dilution be practised as long after the meal as the case admits of. It should be avoided also as a general rule where an obstructed circulation impedes absorption of the water by the portal veins. Patients with dilated heart, for example, and some cases of anæmia and of diseased liver suffer much inconvenience from a sloppy diet. Obese persons also should avoid dilution; it washes away the albumen which they do want, and allows of the absorption of fat, which they are better without.

* A Meal (as in Saxon "male," in German "mahl," and "mal") implies *apportionment* of food, time, or anything else. So Bacon—"the yearly rent is still paid into the hanaper in parcel *meal*"—that is, "in lots."

The chemical toil of the stomach may be spared by giving it less to digest, and more to digest with. Take care that the weak but well-meaning organ is not driven to despair by solid lumps of albuminous food. The best form of nitrogenous aliment in these cases is whey, or milk prevented from coagulating by a copious admixture of lime-water. This fluid meat will pass through the stomach unaltered, the gastric juice will trickle through the pylorus at its leisure after it, and with the intestinal juice will digest the casein in the intestines. Next in easy solubility comes soup, made fresh, weak, and at a low temperature—fresh that it may not decompose; weak—that it may be easily absorbed; at a low temperature—that it may not be filled with innutritious gelatine, or with hard-boiled albumen. Meat is suitable in proportion as it is soft, easily disintegrated, quickly cooked, and free from fat, which might oppose the soaking in of the gastric juice. The well-known list of Dr. Beaumont sets in the order of these qualities a great number of articles of diet. But I think it more useful for you to have the principles of selection than a mere experimental enumeration of the articles themselves.

To mix starchy food with the albuminous in cases of weak digestion is an irrational practice. It soaks up the little that there is of the valuable gastric juice, and then makes no use of it; for starch is quite unaltered by the peptic solvent. This is very bad economy indeed. Moreover, if taken in quantity sufficient to assist much as a nutriment, it is too bulky, and being converted into sugar by the saliva, turns acid in a mass, and puts a stop to further digestion. This is particularly the case if it is in solid coherent lumps, such as potatoes, soft bread, pastry and the like.

Starchy food, unmixed with albuminous, is a different thing altogether. There certainly are some cases of gastric disorder, which are much benefited by a temporary adoption of such a diet. It is the best during acute catarrhal bilious attacks, at the commencement of treatment of even chronic gastric cases, and whenever a dusky complexion, hypochondriasis, or general distress, show that arrested moulting has caused a retention in the body of effete tissues. It does good in fact as a temporary starvation. Hence you will see me occasionally begin the

treatment of such cases by our "simple diet," and still oftener in private practice, where starvation for a time is more generally wanted than in hospitals, I give a patient nothing for two or three days but arrowroot, panada, tapioca, gruel, etc. This enables the congested portal system to disembarrass itself so as to leave a clear space for the taking up fresh supplies.

As you return from a purely starchy, or purely animal diet, to that mixture of the two which is normal and necessary to the healthy condition, or if you consider that the case is not bad enough to oblige you to adopt either one or the other absolutely, you may be of use by so arranging that the two sorts of aliment shall not be together at once in the stomach. For example, let the morning and the evening diet be vegetable, and then let several hours pass before and after a mid-day meal of purely animal food.

Spare thus the stomach by giving it *less to digest*. You need not be afraid of starving your patient by diminishing the quantity eaten. A little digested goes much further than double the amount only swallowed. For example, you saw last time we went round the hospital a girl in the corner of Victoria Ward, who had gained four pounds in weight during six days on the sole allowance of three pints of milk and less than twelve ounces of bread per diem. A man in Albert Ward has also visibly gained flesh in the same time, though he has only a pint of beef-tea besides what I mentioned as the girl's allowance. He is too weak to stand in the scales, but the increase is apparent to the eye. Both these patients had, till their admission to St. Mary's, been trying to strengthen themselves by meat, and whatever they could get, but having gastric ulcers did not digest it, and were rapidly emaciating.

Spare it also by giving it *more to digest with*. I mean by supplying an artificial gastric juice. This is a mode of treatment so interesting, from our being enabled to use it with novel facility, that I shall make it the subject of a separate short lecture,* and thus give fuller details of its practical working than I have time for to-day.

* See next Lecture.

II.

When the functions of the small intestines are off work, spare them.

Of acute diseases, this applies particularly to continued low fever (during both its height and its sequelæ), to enteritis, diarrhœa, and cholera; of chronic diseases, to ulceration, tubercular deposits, either in the peritoneum, Peyer's glands, or mesentery; and, secondarily, to disease of the liver.

What are the functions of the small intestines in relation to different forms of aliment? and what colleagues have they that can be trusted to take their duties during a temporary holiday? The small intestines absorb all matters soluble in water and capable of endosmosis, and have in that work all the mucous membrane of the alimentary canal to assist them. They convert starch into sugar before absorbing it, in conjunction with the saliva and pancreatic juice. They dissolve albumen, and convert it into peptone, in conjunction with the stomach. But in the digestion of fat they have none to help them.

All ordinary fats and oils, then, must be excluded from the dietary of patients affected with the last-mentioned diseases. Even cod-liver oil, so peculiarly wanted in phthisical cases, and so easily digestible, will often become rancid in ulcerated bowels, and aggravate the diarrhœa. If it does aggravate the diarrhœa, depend upon it more harm than good is done by the remedy; leave it off forthwith; the case is an unsuitable one for it at that stage of the disease. And if cod-liver oil disagrees, à fortiori do other less digestible fats. I have known the mere skimming the fat from broth make all the difference whether it were digested or not, and the leaving off such a simple article as butter render a previously useless treatment immediately successful.

Starchy food will agree only on the conditions that it is taken in small quantities, and that the saliva is in a state to do alone what generally it has the small intestines to help it in doing. If the secretions of the mouth are deficient, it will not agree. Hence, in low fever, where the fauces and tongue are dry, you will never see me order arrowroot, bread, panada, gruel, potatoes, or any other amylaceous article. Where they are eaten,

they will be found unaltered in the fæces, and not rarely cause considerable aggravation of the symptoms. I have particularly observed this in convalescent patients after fever. You are often surprised by an unexpected relapse: examine the stools, and there you see lumps of potato, bits of pastry, or a mass of starch granules. The foolish friends have been disobeying orders and giving these articles, which cannot act as a nutriment, and do act as a poison.

On the other hand, a phthisical patient, with a clean moist mouth, will generally digest such things well, in spite of his ulcerated bowels, provided they are well chewed and not lumpy.

Starchy food is exceedingly useful as a placebo to persons whom you wish to keep on low diet, such as rheumatic fever patients, for example.

Albuminous food will agree, provided the stomach is doing its duty. But you must not forget that it has lost a potent colleague, and be careful to prepare the food so as to require only a short time in digestion. Milk must not be passed on to the small intestines by being guarded with alkalies, but had better be soured and made into whey. Some of the curd, broken up quite small, may be taken with it. Frequent dilution with watery drinks, and the use of artificial pepsine, are of eminent use in these cases, so as to ensure the absorption of the food as quickly, and as high up in the intestinal canal, as possible.

III.

Where you wish to hasten absorption, dilute with water.

This is so obvious a consequence of those laws of osmosis which almost every course of lectures—anatomical, botanical, physiological, medical—has occasion to recite, that I will spare you the repetition.

The rule finds its chief application in fevers, but it must not be passed over in ulceration of the alimentary canal and other local disorders, where protraction of the process is painful, or in emaciation and convalescence, where we would not wish to waste time, but to give a person all the nutriment possible in the day.

IV.

When you wish to delay absorption, dilute with solids.

For solids to act as diluents they must of course be incapable of absorption; and the substance I principally refer to is cellulose in its various forms of chaff, bran, husks, skins, seeds of fruit, and fresh green vegetables. Cellulose, being incapable of chemical change there, passes unaltered through the alimentary canal, carrying with it first the chyme prepared for absorption, and then adding its bulk to the fæces excreted. Thus the absorption is spread over a longer time and a larger surface of mucous membrane, the whole of which is brought equally into work. A collateral advantage is that the peristaltic wave acts with more regularity when it has a solid to propel, than when the contents of the tube are fluid only. The rule is useful, not so much at the sick-bed as for the prevention of sickness. Many persons are made ill by their diet being more immediately digestible than they have been used to. Scotch labourers on exchanging oatmeal for wheat-flour, Finn recruits on getting bread at head-quarters without birch-bark in it, country-persons on coming to London or Paris, often suffer from this cause. The mode of prevention is obvious and cheap; cabbages, brown bread, and charcoal offering types of remedies readily altered according to taste.

In the administration of medicines, something may be learned from the same expedient. Quinine occasionally will not agree where powdered bark or decoction of bark will yet succeed very well; and the same may be said of the soluble and insoluble salts of iron, of morphia and opium, and similar drugs identical in all but insolubility. I believe the secret is that a slower and more graduated absorption is gained.

I have elsewhere* stated reasons for suspecting that gum and gelatine may be classed amongst unabsorbable diluents of the food, and are not really nutritious; but the argument is hardly suited to a practical lecture.

* 'Digestion and its Derangements,' book i, p. 260.

V.

When the diet has been diminished, return gradually *to the normal in quantity and quality.*

I suppose mere instinct teaches this, for all acknowledge the justice of it as a sort of truism, and agree that a convalescent diet should be "light" at first, and afterwards more "substantial." Perhaps in respect of quantity error is rare; but the spirit of the rule in regard to quality is often lost by misinterpreting the words "light" and "substantial." Scientific men must not think vaguely, and you must have clearer ideas than the old nurses, who so often hurt your patients by misapplying these expressions. I shall not, therefore, think I am wasting time by explaining what the rule really means.

I formerly* divided foods into such as are capable of direct absorption without change, and such as require a previous change by the digestive juices; and the same division has also been adopted by M. Bernard. By subdividing the latter class into such as require only direct chemical change, and such as require disaggregation as well, we get three groups of aliments; the first the "lightest" or most digestible; the last the most "substantial;" the second intermediate. M. Bernard observes that the first necessitate but one physiological act; the second, two acts; and the last, three;† and, consequently, in that order demand a proportionate amount of labour from the system.

Under the first head come water, essential oils, tea, coffee, alcohol, ethers, salts, sugar, whey, gravy (containing osmazome); asses' milk, with its small quantity of butter and casein, and its large allowance of sugar, forms a transition, through cow's milk, to the second class, in which some soups, lightly cooked eggs, well-boiled liquid starch; in the third class, tripe, oysters, sweetbread, and boiled chicken come nearest to the second, while the power of digesting hard meats (such as beef), or solid

* In 'Digestion and its Derangements,' book i, p. 195.

† 'Mémoire sur la Question suivante mise au Concours, par le Société de Médecine de Lyon, pour l'année 1856, &c., &c.,' obtenue par M. le Dr. Bernard, fils. Lyon, 1857.

lumps of starch (such as potatoes), show that the full normal powers of digestion have been regained. This is something definite, and with this idea you will find no difficulty in making a graduated scale up which a convalescent patient may safely mount.

LECTURE XLVIII.

CORPULENCE.

Obesity to be distinguished from fatty degeneration—Origin of adipose tissue from food either containing fat, or elements capable of conversion into it, in excess over the respiratory consumption—Presumed possibility of relief by dietetic treatment—Tendency to obesity congenital and hereditary—Deductions from thirty-eight tabulated cases as to the peculiarities of obese persons, and the exciting causes of their condition—Obesity a comparative hypertrophy arising out of a comparative vital deficiency—Principles of rational treatment thence deduced—Difficulties in enforcing their adoption—Specimen of detailed scheme of dietary—Limits to attempts at reduction—Drugs, such as liquor potassæ, vinegar, iodine, and diuretics, discussed—Belts and baths—Prognosis of obesity.

(*St. Mary's, Course on Practice of Medicine, part of lecture on "Hypertrophies." December* 1*st*, 1862.)

As Gulstonian lecturer I delivered at the College of Physicians, in 1850, a course of lectures on Corpulence, and published them in a little duodecimo afterwards. As more than a dozen years have passed by, and the volume has been long out of print, I may be allowed to dish up some old matter, and to give you an analysis of the more practical parts of what I then said at fuller length before a more stately audience.

In the first place, I carefully distinguished obesity, or the inconvenient presence of a large quantity of normal fat, from fatty degeneration of existing tissues. I traced the origin of the true adipose tissue, showing by well-established physiological

observations, that it is derived entirely from the food eaten, in a great measure directly, as fat previously ready-made, and partly from articles, such as starch, readily converted chemically into fat. And I laid down the law that for the formation of fat the preliminary need is that the materials be digested in greater quantity than is sufficient to supply carbon in equal amount to that consumed in the respiration.

Thus you see I showed the probability that by modification of diet we may be enabled to govern effectually at will the formation of fat in the human body.

The next point I aimed at making was that the excess of fat which inconveniences a good many people owed its origin to a congenital, often hereditary, structure of body. The peculiarities of this structure of body are most manifested in the functions of the assimilating organs, especially in the intestinal absorbents, which are more active than is consistent with the size of the body, and which are mostly concerned with the osmosis of oleaginous particles. It is impossible of course to demonstrate during life this important, perhaps the most important, peculiarity. But there are others which are capable of being made subjects of observation, and these I endeavoured to make evident and to base upon fact by a table of notes I had made of the cases of thirty-eight obese persons then alive, or at least alive when the notes were written, and ranging in weight from about sixteen up to thirty-six stone (504 lbs.).

From this table I drew the following deductions :—

1. That in corpulent persons the bony frame-work of the body is less massive than in the spare, as indicated by the smallness of their hands and feet.

2. That the skin is usually fresh-coloured and thin, and the hair soft and fine.

3. That in youth and middle age their digestive apparatus performs its task with rapidity. The action of the bowels is generally natural, and in some cases loose. But where the accumulation of fat is principally in the omentum, a pendulous state of abdomen is apt to be produced, causing a displacement and dilatation of the intestinal canal, and makes it sluggish and irregular.

4. That their respiratory function presents a well-marked and universal peculiarity. The volume of air which they are capable of containing in and expiring from their chest is considerably less than the average quantity contained and expired by healthy persons of equal height. The lungs, instead of holding an amount of air proportioned to the size of the body, seem of diminished power. "Thus the vital capacity of H. T. (No. 35) a man of enormous muscular strength, and in his youth remarkable for his power of wind, ought to have been at least 250 cubic inches; instead of that it is but 205. Ch. S. (No. 9) held but 120 cubic inches of air, whereas she ought to have contained 206, according to the table of healthy averages published by Dr. Hutchinson. G. O. R. (No. 18) when in perfect health, in 1845, held 255 instead of 270 cubic inches." The lungs therefore in obese persons are small, and consequently their exhalation of carbon deficient.

5. That the reproductive powers are by no means defective, some being very fertile and few barren.

6. That a tendency to obesity is decidedly hereditary; though the actual disease is not always developed in every member of the family, and rarely before adult age.

7. That of the exciting causes in those predisposed to it, none appears so common as the occurrence of an acute attack of illness. Next surgical injuries, and next chronic diseases of such nature as to render confinement needful without injuring the constitution.

8. Taking a large quantity of liquid, of any description, is another frequent cause of corpulence. Of course if the liquid be fatty at the same time, such as in the case of milk, still more striking effects are produced. And the mixture of alcohol and sugar, such as we find in beer and sweet wines, makes an equally deleterious drink.

9. Deficiency of sun-light has a similar effect. A case is cited from the table (No. 13) of a man employed in the cellars of a brewery, who, in spite of strict temperance, found his bulk become so great as to give him much alarm. He obtained a situation as clerk in the same establishment, and found the employment above ground cause a rapid reduction.

It is made to appear by what has gone before that the accumulation of fat in the tissues is a partial and comparative hypertrophy—comparative, that is, with the proportions of the other functions—connected with a comparative deficiency of the decarbonizing force of the lungs at least, and possibly of other organs.

Hence were deduced the principles of the treatment shown to be rational by physiology and efficient by experience.

1. The dietary must be made the special object of care; it must be habitually different from that of ordinary healthy persons, inasmuch as the obese differ congenitally from others.

2. All oleaginous articles of food should be rigorously abstained from: fat, oil, butter, milk, cream, maize, and the like, must be entirely abstained from. Sugar must be left off. The amount of other hydrocarbons must be reduced to the minimum; starch, in the form of potatoes, bread, &c., being looked upon with extreme suspicion.

3. To avoid the transformation into fat of starchy articles of diet, which it is impossible wholly to shun, it is desirable that food should lie in the stomach as short a time as possible, in order that a fatty fermentation (so to speak) may not be set up in it. Therefore very light meals at not too long intervals should be taken, at times most favorable to rapid digestion, and should consist of substances easy of solution and assimilation.

4. Liquids should be taken at the end, and not at the beginning, of the meal; so as not to impede the mixture of the gastric juice with the mass.

5. The liquids taken should be small in amount.

6. Inasmuch as excess of alcohol diminishes the excretion of carbon (as shown by Böcker's experiments) the quantity taken should be limited to that found by experience in the case of each individual to quicken the digestion.

7. Exercise should be taken to sufficient extent fully to employ the muscles and lungs. But it should not exhaust completely the strength, otherwise an imperfection of digestive powers is the result.

8. The exercise should be taken in the open air and sun-light.

9. As in the management of all congenital tendencies, medicines must be looked upon as wholly secondary to regimen.

Those adopted should be such as tend to increase the metamorphosis of fat and its habitual evacuation in the form of carbonic acid.

10. The quality of the food is of more direct importance than its quantity.

The hourly watch over the instinctive desires, which must be observed by one desirous of reducing his corpulence makes it a serious thing to advise the undertaking of the necessary regimen. Many of us shirk giving our advice, because we feel confident that the patient has not strength of mind to follow it. He that commences it must be taught to view himself as his worst enemy. Like Epictetus' philosopher, he must "mount guard and plot against himself." We must feel very sure we are doing what is right before we take such a responsibility, otherwise hesitation will produce wavering, and wavering shake the confidence of the patient, and all hope of benefit be lost. All advantages should be taken of adventitious circumstances to add importance to the enforcement of the rules; they should be written out clear and exact, and enjoined as strictly as if they were moral precepts. If left to general and verbal instruction, their chance of being observed is small indeed.

At the same time the dietary prescribed, and the hours fixed for meals should not be such as it is impossible for men actively engaged in business to submit to. In detail you may lay down some such scheme as this—

Breakfast to be taken early and to form a substantial meal, so as to prepare for the day's work. The solid part of it to consist of two mutton chops with the fat carefully removed, grilled or plainly cooked, and captain's or ship biscuit. Sometimes a pigeon, a bit of game, or a fish of about the same weight, may be substituted for the mutton chops. For liquid to follow, if the patient will take soda-water or plain water so much the better. If he cannot get over his craving for a cup of tea, let him take it in the Russian fashion with a thick slice of lemon floating on the top instead of milk.

Luncheon at one may consist of the same ingredients, only instead of so much liquid, a glass of half and half, sound claret, or burgundy and water is more agreeable as well as more wholesome.

Dinner to be taken earlier than is usual now-a-days. Six o'clock is the best hour. Soup and fish must be eschewed, and plainly cooked mutton and beef, especially the former, made the staple of the meal. A bit of biscuit may accompany it, and as vegetables, those which contain much insoluble chlorophyll and little starch, as cabbage, lettuce, spinach, French-beans, or celery in small quantity; but no potatoes. In short the dinner should be as much as possible that of a carnivorous animal. Sweets, pastry, eggs, and beer, must be avoided like poison. Next to water, claret is the best drink; champagne (according to the well-known writer on this subject, M. Dancel) the worst.*

Here should end the serious feeding for the day. A cup of Russian tea, or a water-ice may be taken during the evening, but a glass of water or soda water is better.

The emptiness or sinking at the pit of the stomach felt by those who begin a diminished diet, and which they often are driven to remove by eating and often (still worse) by drinking, is best relieved by chewing a bean or two of coffee. A supply sufficient for all wants is easily carried in the waistcoat pocket.

I do not think it advisable to burden the conscience of the patient by laying down the number of ounces of each food which should be consumed. The nature of the food is of more importance than its exact quantity, and the exhibition made by eating from scales is annoying to touchy persons.

Some persons are able to do without the dinner at all, and indeed in 1850 I was inclined to urge the adoption of this plan, and to substitute for it biscuits and water taken standing up or while walking about. This is not a scale of diet absolutely unattainable. A retired butcher and pugilist whose case I had tabulated (No. 35) had adopted it for some years with the greatest comfort to himself. He was able to work upon it in a most violent manner in a small garden he cultivated for himself in the suburbs. He had reduced himself from 20 to 17 stone; whereas his brother, who had not the same strength of mind, had increased to 23 stone. Persons of more refined education

* M. Dancel cites an instance of a young lady who, with the intent of preserving her symmetry, fasted four days every week upon champagne and "marrons glacees" alone. Her outline grew out of all drawing with frightful rapidity. But she regained it on resuming a more rational diet.

have, or ought to have, the same power over their appetites. J. R. (No. 7) reduced himself from 22 to 18 stone, and has sometimes brought himself down to 17. But he found no particular advantage from being of the lower weight.

This latter remark leads me to observe that in all persons there is a certain weight, to be found by experience, called by trainers "the fighting weight," necessary to full force, and that to be lighter than this tends to injury of body and mind. And I must also say that mental workers do not bear abstinence so well as bodily workers, and that I do not think it advisable for a man whose mind is much engaged to attempt the omission of the usual evening meal. But he may at it feed his nervous system with meat, and not his adipose tissue with starch and oil.

As to more strictly medical remedies I have found full doses of liquor potassæ at the beginning of the treatment very beneficial, especially in persons who are incapacitated by bodily infirmity from taking sufficient exercise. I presume that it acts by increasing the vital powers of metamorphosis, by saponifying in part the fat contained in the blood and enabling it to be burnt off as carbonic acid. But I must repeat again that the prescription of drugs is strictly secondary to that of diet. Where the size of the abdomen impedes the walking, a belt, such as pregnant women wear, is useful. A few sweating baths are also beneficial at the commencement, as they bring the skin into good condition; but as an habitual resource they are debilitating.

Of vinegar and iodine as medicines I have no good to say. The moderate use of iodine certainly does not cause the disappearance of healthy fat. Indeed, it has been noticed by Lagol,* and is matter of daily observation at our metropolitan hospitals, that patients frequently acquire a considerable amount of embonpoint during the time they are taking iodine. The cases of tumours and of fat are very distinct. As Dr. Pereira remarks,† "The enlargements which these agents (mercury and iodine) remove are not mere hypertrophies; their structure is morbid, and they must in consequence have been induced by a change

* 'Essays,' translated by Dr. O'Shaughnessy.

† 'Materia Medica,' vol. i, p. 196 (edit. 1848).

in the quality of the vital activity; in other words, by morbid action. Medicines, therefore, which remove these abnormal conditions, can only do so by restoring healthy actions." But the action which causes the deposition of fat in the adipose tissue, is of a healthy nature, and harm rather than benefit, is to be expected from the drug under discussion;—that harm which always accrues from a valuable remedy wrongly employed.

Of diuretics, as recommended by the older physicians I have no experience. But as there is no secretion by which less fatty matter is excreted than that of the kidneys, they do not seem to promise well.

The prognosis depends very closely upon the age at which the obesity has commenced. To that form of the disease which begins at birth, and goes on increasing during infancy and childhood cure is unattainable. It is a sort of monstrosity, and the subjects of it usually display some other bodily malformation or a deficiency of intellect. When it begins in childhood or about the time of puberty, we must not be deterred by the circumstance of its being hereditary, from trying to remedy the inconvenience. We cannot truly reduce our patients entirely to the average size and weight but we may enable them to pass life in comfort and usefulness.

The later the disease begins, the more controllable it is by management; until the prime of life is passed, and then old age impedes in some degree the benefit we may confer, not by rendering our measures inert, but by preventing our employing them quite so actively as we should have done earlier.

LECTURE XLIX.

ON PEPSINE.

History of the use of gastric juice in medicine—Difficulties of its use obviated by preparation—Experience of its use in a few typical cases—Limits of advantages gained—Details of administration.

(*Extra course, St. Mary's, Summer Session,* 1857.)

The attempt to turn the peculiar powers of gastric juice to advantage in medicine dates from remote antiquity. Pliny mentions the fluids of the stomach of sucking animals as in common use for a variety of purposes, such as curing disorders of the intestines, allaying the inflammation from spiders' bites, stopping bleeding from the nose, preventing snakes attacking you, and in short against poisons in general.* Asclepiades also recommended it as a means of dissolving milk which has clotted in the stomach in dangerous excess.† Galen, arguing probably on his physiological theories, attributes a "digestive" and "drying" power to it. But he also mentions having felt in his own person the relief afforded by it to weight at the epigastrium after drinking too much milk, and advises a trial of it in abdominal disorders. He remarks that the stomach of one animal differs from another only in degree of power. He gives a warning also that the boiling temperature destroys its virtues, as we now well know; for he found that hens' and cormorants' stomachs, when cooked, were perfectly inert.‡

* See the places referred to in any good index to Pliny's 'Naturalis Historia,' article "Coagulum."

† Quoted in 'Galen on Antidotes,' ii, 7.

‡ 'Galen on Simple Medicines,' x, 11; xi, 13.

On the strength of his rational advice the coagulated milk and fluid taken from the paunches of several young animals was a remedy sufficiently often used to retain a place in European pharmacopœias up to the first quarter of the last century. This is the explanation given by Dr. Schröder, a Dutch pharmacologist, who wrote in 1672,* of the method of preparing, and the reason for using, "*Coagulum leporis,*† *hædi, agni, equi,*" &c.

The disagreeable nature of the remedy in this form probably drove it out of use, for the last London pharmacopœia in which it appears is that of 1677. In the edition of 1721, the only representative of gastric juice is the mucous membrane of the hen's stomach—"*Pelliculæ stomachi gallinæ interiores.*" ‡ In 1746 this also had vanished, along with "*stercus bovinum, humanum, pavonis,*" and various similar remedies which patients had got too civilised to submit to, without at least knowing the reason why. Thirty years later, the immortal experiments of the Abbé Spallanzani threw a bright new light into the subject of digestion, and taught the true nature of the gastric juice. With much juster views than of old, its use in medicine was again recommended. Dr. Mongiardini, of Pavia, a pupil of Spallanzani's, at his master's instance treated indigestion successfully with the gastric juice of crows. Another pupil employed it as a lithontriptic, to break down calculi by destroying the animal matter which holds them together. M. Senebier, a clerical pupil, suggested that its antiseptic power might make it useful in surgery, and advised a trial of sheep's paunch as an application to ill-

* 'Pharmacopœia Medico-Chemica.' Amstelodami, 1672.

† The rennet of the leveret is now usually wasted, but the Roman dairymaids preferred it to that of any other animal for making cheese. Varro ranks it as the best, then that of the kid, then of the lamb. (Varro de 'Re Rusticâ,' lib. ii, xi, 4). The Roman physicians also had the same preference. Sammonicus, in a prescription for "Colus" (Colic), says, "Aut pavidi leporis madefacta coagula pota." ('Quinti Serini Sammonici de Medicinâ Præcepta,' "De Colo compescendo.") This accounts for its being named in pharmacopœias which omit other rennets, as for instance in the Vienna priced drug list of 1613 a 1646, in which its price varies from six to sixteen kreutzers the half-ounce.

‡ This is another Italian expedient for coagulating milk rarely used now. Palladius recommends it for making summer cheeses, when you cannot get leveret's rennet. ('Palladius de Re Rusticâ,' "Mensis Maius," ix.)

conditioned wounds.* M. Boyer, of Strasburg, found that it destroyed the poison of the viper, and thought it might be an antidote to snake bites.†

With all the obvious advantages with which the remedy recommended itself to the physician, there was the insurmountable difficulty of obtaining it in a form fit for general use internally. It was of course necessary to administer it at the same time with the food, and any nauseating substance then given does more harm than good by taking away the already squeamish appetite. Dr. Latham, who practised in Paris some years ago, informed me that Laennec had a preparation of concentrated gastric mucus, which he recommended with great enthusiasm; and Dr. Handfield Jones at this hospital gave in some cases a cold infusion of pig's stomach, acidulated with muriatic acid. In this form, however, the remedy is disagreeable and inelegant.

But the matter showed itself in quite a new light when an ingenious French pharmacien, M. Boudault, at the instigation of Dr. Corvisart, made the very elegant and agreeable preparation, called "*Poudre nutrimentive.*" It is simply pepsine from the sheep's stomach dried on starch, with lactic acid added or not according to circumstances. You have during the past winter (of 1856-7) seen me prescribe it to numerous patients in the wards, and I have also employed it frequently in private practice, so that I think we are in a position now to form an idea of its value to the practical physician.

These hospital cases in which I have administered it with advantage are, six of phthisis pulmonalis, one of cancer near the pylorus, two of gastric ulcer, one of hysterical vomiting, two of nausea, one of hysterical pain after eating, two of atonic pain after eating, one of atonic gout, one of dilated stomach, one of gastric flatulence, three of low fever, and two of pneumonia. In these the full benefit which physiological reasoning would lead us to expect from the remedy has followed.

[These cases fairly represent my since experience of the remedy.]

* 'Expériences sur la Digestion de l'Homme, par l'Abbé Spallanzani, avec des Considérations,' &c., par Jean Senebier. Genève, 1783.

† Falck 'Handbuch der Arzneimittellehre,' vol. i, p. 275.

I have also injected it *per anum*, mixed with food, in a case of ulcerated œsophagus, and in a case of manio-hysterical vomiting and dysphagia. But in neither did it appear to delay death. Probably the patients were already too far gone.

Several other cases of atonic pain after eating, in which I have given pepsine, I have not since heard of, but probably should have done so had any harm happened.

In one case of chronic dysentery it was stated to cause nausea and loss of appetite. In one case of consumption, and in one of pendulous tumour of the abdomen, it purged the patient. These are the only instances of inconvenience that I have been able to connect with the administration of the remedy.

The phthisical cases have been those where a progressive anæmia was accompanied by an inability to digest meat or other albuminous food. This inability is exhibited in three ways: first, by meals of such diet, even in very small quantities, being followed by a sense of great weight and oppression at the epigastrium, and sometimes by actual vomiting; secondly, by the passage of loose fetid stools containing much unaltered muscular fibre, lumps of fat, and such like remnants of a recent meal; thirdly, by entire loss of appetite and an instinctive nausea roused by the bare idea of flesh food. Often all three phenomena exist together; but each one may be found separately, and is of itself a sufficient indication of the patient's state.

The state of the stomach when these symptoms occur is probably an excessive secretion in the upper part of the alimentary canal of alkaline mucus, which envelopes the food, and prevents the action of the gastric juice upon it. The consequence is, either its rapid ejection unaltered, or its decomposition, and the evolution of fetid gas. If vegetable food be mixed with the meat, it ferments into acetic acid, and thus you may have sour eructations from the stomach, and diarrhœa arising out of the want of gastric juice. If this excessive secretion of mucus is recent and moderate, the appetite may remain uninjured, nay, may sometimes be morbidly increased; but a long continuance, joined to progressive pulmonary disease, is sure to induce an anæmic condition of the alimentary canal, which results in a disgust for food.

Now this state of things it is very important to check. If it

goes on, the patient cannot take in sufficient quantities the meat which should refresh his degenerating muscles and pale blood; he cannot take the cod-liver oil which is to replace his emaciating tissues; he cannot, from weakness, take the exercise which might renew his whole diseased system. And I do not know any remedy which more readily, obviously, and directly does what it can towards checking such a state than pepsine. It does immediately and surely what it can do; but then that is not very much. Raise not your expectations of its power too high, or you will be disappointed. Understand clearly what position this agent holds in the rational materia medica, and then you will know what good results you may demand with reasonable hopes of obtaining them. It is an artificial, and therefore a partial, substitute for a natural process. Gastric juice prepared by a healthy animal is mixed with the food, instead of that which the patient's stomach ought to prepare. And it acts in the body just as it would out of the body under the same circumstances of heat and motion. The chewed meat is dissolved by it just as you see the white of egg suspended in this beaker dissolved by it; and the putrefactive process is arrested by it in the intestinal canal just as you perceive the putrefactive process is arrested by it in the experiment under our eye. For you may observe that this albumen suspended in pepsine is quite sweet, whereas that soaked for the same time in saliva is most fetid. It is, therefore, a substitute for the natural secretion, and to a certain extent supplies its place.

But like all imitations of nature it is coarse and imperfect. The solvent, instead of being gradually and continuously poured on to the outside of the mass of food, is mixed up in the middle part of it, and acts merely chemically, without any of the mechanical and physiological helps belonging to natural digestion, and consequently soon exhausts its energies. The chyme, or albumen prepared for absorption, instead of being wiped off and swept away by the stomach, remains for some time mixed up with the pepsine, so that the latter is not freed for the solution of a new portion. By this imperfect process only a very small portion of meat can be dissolved at once.

Hence, if you hope that by administering pepsine with it, you can get a full and sufficient meal eaten at once by your consump-

tive patient, you will fail in your expectations. Give half a mutton chop with the remedy the first day; and if that is digested well, a whole chop next; but then you have got to the end of your tether, and the digestion of a larger quantity will not be at all assisted by artificial solvents. After a chop has been digested and absorbed twice, or even once a day by this means for about a week or ten days, the expedient has probably done all the work that can be fairly asked of it, and the stomach has either recovered sufficient energy to digest alone, or will require different remedies to enable it to do so. Therefore, for the pepsine to be completely successful in these cases—first, it must be given only to those who cannot digest half a mutton chop without it; secondly, more than a chop must not be given at once; thirdly, it must not be required to go on alone improving the patient's condition for more than a week or ten days.

But for the time named I advise its being given alone, and the action not interfered with in general by other drugs. Many will really prevent its chemical effect, and all will confuse your judgment of the advantage gained. In this time you will generally find that the repugnance of the patient to meat has been overcome, and that a small quantity of it at a time can be relished and digested; the morbid fetor of the stools diminishes, and the flatulence and distress arising during their passage through the bowels ceases. A renewed strength and a renewed power of assimilation commence, the sleep becomes more natural, with the diminution of night-sweats and hectic; while, at the same time, the pulmonary symptoms of cough, dyspnœa, &c., relax, and a step at any rate is taken in the right direction towards the cure of the disease. It is remarkable, too, what a slight improvement in the digestive powers will often enable iron and cod-liver oil to be taken. These drugs are, you know, the main stays in the treatment of tubercular consumption, and any expedient, however temporary, which will pave the way for their administration, is a great boon.

It would not suit the plan of the present lectures to quote in detail these consumptive cases. They differ much from one another in their unessential characters—namely, in the stage and general phenomena of the disease, in age and sex of the

patients; while they all closely resemble one another in essential points—that is to say, in those which I have described as indicating a mucous condition of stomach, preventing the gastric juice being poured out on the food, and finally leading to anæmia and atrophy of the secreting membrane. They resemble one another also in exhibiting an immediate and uniform amelioration of limited extent. In one man who had loss of voice, apparently from crude tubercle in the lungs, with ulcerated trachea, the amelioration of voice and cough continued so long, that I let him remain three weeks taking pepsine alone without other drugs; but, then, he also continued to improve more afterwards on cod-liver oil, so that he might just as well have commenced it sooner. In another, who had tubercular ulcers in the bowels, afterwards fatal, there was an idea that the pepsine caused a relapse of diarrhœa; but I suspect the coincidence was accidental. These are the only cases where it appeared to do more good or less good than I have attributed to it.

The case I alluded to of cancer near the pylorus is an instance of a disease necessarily fatal being still worthy of the careful attention of the medical man. When the patient came under my care, she was unable to keep anything at all on her stomach: every solid, even an ounce of beef-tea, was vomited unchanged within half an hour of its ingestion. She had been taking prussic acid, soda, creasote, opium, and a variety of remedies without benefit; and, as might be expected, was dying rapidly of starvation. I ordered her immediately half a mutton chop, with fifteen grains of Boudault's "poudre nutrimentive," twice a day, and an ounce of milk and lime-water every two hours. She kept all that down; it passed the pylorus, and nourished her so far that she had a good night's sleep, and the next day was able to take a whole mutton chop. So she went on for three weeks, gaining flesh, losing her pain, and acquiring a cheerfulness about the future unwarranted by the gloomy prognosis which truth compelled me to give her. So far all was right; reason had reasoned well. But I feel it a duty to tell you the mistakes I make, as much as the occasions on which I act wisely. And I find recorded in my notebook a warning, which I advise you to profit by, of the importance of "letting well alone." The patient from the first had

jaundice, with pale stools and bilious urine; and now, I thought, had sufficiently recovered strength to bear an endeavour to make the liver clear the blood of its bile a little more briskly. I therefore gave her some nitro-hydrochloric acid, which is often of great use under similar circumstances. But the result was most unfortunate. The vomiting returned with violence. The drug was left off, and the vomiting stopped, but not before the ground gained had been lost. Then again, contrary, I must say, to my wish, it was judged expedient to give the patient mercury, and she rapidly sank. The jaundice was then proved to be dependent on cancer of the gall-bladder. Now, here it is impossible not to allow that life was lengthened by artificial pepsine, and would have been further lengthened but for a meddlesome propensity in both physician and patient for continuous improvement.

In one case of hysterical vomiting, and two of nausea preventing a due quantity of food being taken by hysterical persons, this remedy has appeared to enable the patient to swallow meat. The mere nutriment thus imbibed has improved the appetite for future meals; and the valerian and salt sponge-baths afterwards administered seemed to have a more rapid effect than without it. The rational explanation of its good influence is, that both in hysteria and anæmia the secretion of gastric juice is apt to be irregular and deficient, and that the morbid processes here act, as is so often the case, in a circle; the non-secretion of gastric juice still farther starving the blood and aggravating the hysteria and anæmia, and that further aggravation again diminishing the secretion. But once breaking the magic chain, and enabling even a single meal to be well digested, begins a march towards health which it is comparatively easy to guide afterwards.

Closely connected with the last-named complaints is, in the female sex, atonic gastralgia. Indeed I may say it is practically identical. At the same time that the gastric juice is imperfectly secreted, the muscles of the stomach refuse to perform the peristaltic motions with sufficient activity. Hence not only is the alimentary mass a greater inconvenience than it ought to be, but it actually lies longer than usual in the first portion of the canal, as may be found on percussion of the epigastrium.

Atonic gastralgia is a common consequence, in the educated classes, of excessive mental and sedentary labour. Where this is very great, I have found pepsine of some use; but in the slighter cases, which more frequently come before us, I have not seen any apparent benefit accrue from it. A change of habits is here the only permanent remedy, and of drugs strychnine is the most efficacious. I believe M. Boudault prepares a powder in which strychnine is combined with pepsine and lactic acid. I presume it is for cases of this sort that it is intended, but I have not tried the combination.

In a case of diarrhœa and mucous vomiting, occurring in an old victim of atonic gout, the stools became more natural and less frequent, and strength was regained, on taking pepsine and mutton chops, instead of opium and acetate of lead.

As cases of acute disease have a habit of getting well of themselves, they are not of course such good tests of the essential benefit derived from remedies; and it is only by comparisons on a large scale that one could speak of fever and pneumonia being benefited by pepsine. There seemed, however, in those alluded to, an immediate improvement to take place in the appearance of the tongue and of the evacuations; and it is impossible not to think that the amelioration in the alimentary canal thus made evident would tend to lessen the mortality of these diseases.

On the whole, then, I cannot but conclude that we have in artificial pepsine a valuable and safe remedy, and an important aid to rational medicine.

The way in which I have given it has depended on the diet on which the patient is placed. If regular meals are eaten, then it is best taken spread as a sandwich between two thin slices of bread at the commencement of the dinner. Fifteen grains of the starchy powder is the usual dose for an adult. If the patient is so ill that the food is obliged to be administered more frequently and in small quantities, so as to keep up a continuous supply, smaller doses of the pepsine powder may be given in a draught every four or five hours.

LECTURE L.

ON ALCOHOL.

Experiments showing the action of alcohol on the vital metamorphosis of the body, with a running commentary on each—Opposite opinions about the use of alcohol—Best guide to therapeutical use is physiological observation of its action on the healthy body—What is a stimulant?—The effect of alcohol is arrest of nervous function—How it comes to be an indirect restorative—Rules for the administration of alcohol—Form of administration.

(*St. Mary's*, 1861.)

The porter of our school and the late Mr. Hall Smith assisted me, in 1860, in a series of experiments on the effects of alcohol. The melancholy circumstances of the latter's death brought them to an abrupt termination, and made the prosecution of the investigations painful to me. But still let us see what can be done with the facts already collected, and try whether they can be made of service to clinical medicine.

I.—W. M. Age thirty-eight. Weight 254 lbs., taken at noon every day. Habits of life extremely regular. He walks half an hour before breakfast daily; breakfasts at eight on two cups of coffee, bread and butter, and a slice of cold meat; dines at one on beef and mutton in regular quantity, potatoes, and pudding; has tea at five, two cups, with bread and butter; sups at nine, on bread and butter, or cheese, with half-a-pint of ale. He sleeps six and a half to seven hours. His bowels are open once daily.

A view of the normal amount of metamorphosis in the body is afforded by this table:—

	Quantity in cubic centi-metres.	Specific gravity.	Urea in grammes.	Chloride of sodium in grammes.	Sulphuric acid in grammes.	Phospho-ric acid in grammes.	Uric acid in grms.
Amount of urine and its several parts made in 23 days, in perfect health and on usual diet	24,970	23·518	728·437	174·625	51·307	44·719	...
Ditto in 15 days	...	...	...	...	...	...	2·813
Mean daily amount ...	1,085	1·022	31·671	7·592	2·230	1·944	·187

The effect of the addition of a moderate quantity of alcohol to the daily meal is shown by the next:

Date.	Quantity in cubic centi-metres.	Specific gravity.	Urea in grammes.	Chloride of sodium in grammes.	Sulphuric acid in grammes.	Phospho-ric acid in grammes.	Uric acid in grammes.	Daily quantity of best French brandy added to meals in ounces by measure.
Sep. 13	1,020	1·024	30·708	7·140	2·017	1·469	...	$4\frac{1}{2}$
„ 14	1,570	1·022	39·746	10·990	2·579	·848	...	3
„ 19	1,050	1·026	38·795	8·400	2·456	1·890	...	
„ 20	1,200	1·025	42·695	9·600	2·622	1·944	...	6 viz., $1\frac{1}{2}$ at breakfast, dinner, tea and supper.
„ 21	1,110	1·023	37·974	6·937	2·212	1·798	...	
„ 22	770	1·026	30·030	6·160	2·065	1·386	...	

On the next day the appetite for food was observed to be somewhat less than usual, and the experiment ceased; for any change of usual weight, health, feeling, or habits, of course would vitiate the result of an investigation conducted in this form.

These few experiments lead to the belief that the taking a moderate quantity of alcohol with food—

(1*st.*) *Increases the quantity of urea daily excreted, and in a much minor degree that of the chlorides and sulphates;*

(2*nd.*) *It does not increase the aqueous part of the urine;*

(*3rd.*) *It decreases the quantity of phosphates;*

(*4th.*) *The augmentation is temporary, and after a time is followed by a reduction to the normal measure, which reduction is coincident with a loss of appetite.*

The increase in the quantity of urea excreted would seem to show that the renewal of the muscular tissues, the appropriation of new flesh, and the removal of old flesh, go on more actively for making a moderate quantity of alcohol part of the daily food.

The non-increase in the aqueous secretion, and the decrease in the phosphates, would seem to show that this change is not merely a general augmentation of the destructive metamorphosis of the body; for if it were, the whole of the constituents of the urine would be equally affected.

In short, the circumstances seem to indicate that a moderate dose of alcohol acts by temporarily augmenting the digestive power of the stomach, helping it to appropriate more thoroughly the food.

The decrease in the excretion of phosphates is an interesting observation. The chief source of phosphorus in the urinary excretion must be nerve tissue, and it is certainly something more than a mere coincidence when we see a re-agent, whose effects are most peculiarly manifest on the functions of the nerves, diminishing what we believe to be the metamorphosis of that portion of the body. We can hardly hesitate to call alcohol an arrester of nerve-life, and consequently a controller of nervous action on the rest of the frame; and it would be wise to cast about for explanations which would harmonize this with its other operations.

II.—Letitia C., a prostitute, aged twenty-three, acquired the habit, during a year of her being on the town, of frequent tippling to drown care. Standing by her bed on the 14th of August, she suddenly fell on to it, not from apoplexy, but from complete paralysis of the right leg and arm without a fit. On her admission to St. Mary's, two days afterwards, the power had returned in a great measure to the limbs, but the right lingual and facial muscles were still quite paralytic. As far as one could judge by external phenomena, all the viscera except the brain were in a healthy state. She stayed in the hospital

till September 6th, when she was offered a place as servant, and a slight impediment to speech remaining I considered not sufficient reason for her passing over so good a chance of bettering her social state. During the time she was under observation no drugs were prescribed for her; she rested on her bed the greater part of the day, and sauntered about the ward and garden the rest; she was kept on "broth diet." *

The amount of urine and of its chief constituents excreted by her on all the days when circumstances allowed it to be all collected is shown in this table:—

Date.	Quantity in cubic centimètres.	Specific gravity.	Urea in grammes.	Chloride of sodium in grammes.	Sulphuric acid in grammes.	Phosphoric acid in grammes.
Aug. 17	252	1·018	5·915	1·389	?	·409
„ 19	880	1·006	12·729	4·400	?	·396
„ 20	240	1·014	4·529	2·040	?	None
„ 21	270	1·007	3·429	·337	·206	·061
„ 22	360	1·011	5·280	2·340	·212	A trace
„ 23	1,000	1·007	15·353	3·500	·878	·540
„ 24	1,280	1·007	14·504	4·480	·715	A trace
„ 27	570	1·008	9·405	1·425	·436	A trace
„ 28	1,030	1·007	10·979	3·862	·596	·494
„ 29	730	1·010	9·252	3·285	·423	A trace
„ 30	1,320	1·008	13·645	5·120	1·039	?
Sept. 1	...	...	...	...	...	...
„ 2	1,650	1·008	22·027	1·358	7·425	?
„ 3	...	...	...	...	...	...
„ 4	...	...	...	...	...	...
„ 5	900	1·010	13·231	2·925	·790	·162

It will be noticed that in the last three observations there is an improvement in the amount of those solid constituents of the urine which are an evidence of the force of vital metamorphosis. This improvement was coincident with the addition of three ounces of brandy to her diet card, an ounce and a half at dinner, and an ounce and a half at supper daily.

* Tea, 2 pints, with 3 oz. of milk, and sugar q. s.; Bread, 12 oz.; Butter, ¾ of an oz.; Broth, 1 pint, with 4 oz. of boiled meat; Gruel, 1 pint.

In this case, then, we again find alcohol appearing to aid the vital force of metamorphosis when taken with food. The quantity of urine, of solid matter in it, of urea, of chloride of sodium, and of sulphuric acid, is augmented. The phosphates, truly, are remarkably deficient, but that probably depends on the arrest to the renewal of brain substance which the injury to her brain entailed.

III.—The first subject, W. M., at another time tried the effect of alcohol taken in another way, namely, in small divided doses. Six ounces of brandy were drunk daily in drams of half an ounce every hour from 9 A.M. to 9 P.M.

This is a record of the results:

Date.	Quantity in cubic centimètres.	Specific gravity.	Urea in grammes.	Chloride of Sodium in grammes.	Sulphuric acid in grammes.	Phosphoric acid in grammes.	Uric acid in grammes.
Aug. 18	1,520	1·013	30·465	5·320	2·210	1·299	·008
„ 20	910	1·025	33·077	6·370	2·375	1·474	·259
„ 21	1,070	1·022	32·945	6·687	2·246	1·637	·193
„ 22	1,000	1·021	23·735	6·750	1·897	1·440	·135
„ 23	1,310	1·015	25·097	7·205	1·649	1·061	·196
„ 24	1,530	1·021	41·867	9·945	3·064	2·203	·390

One day was an interval in the experiment, and only the usual amount of daily diet, without extra alcohol, was taken, when the numbers stand as follows:

Date.	Quantity in cubic centimètres.	Specific gravity.	Urea in grammes.	Chloride of Sodium in grammes.	Sulphuric acid in grammes.	Phosphoric acid in grammes.	Uric acid in grammes.
Aug. 19	920	1·026	35·88	5·750	2·374	1·904	·281

It is very clear from these observations that alcohol taken in the dram-drinkers' fashion, namely in small divided doses, by no means increases metamorphosis. It rather tends to diminish it, and this diminution is not sudden or immediate, but is more and more for a certain period, till the retention reaches a point,

at which a critical discharge takes place in healthy persons. This discharge may take place either in consequence of the alcohol being left off, as may be observed in the day of interval; or from an idiopathic reaction, as on the 24th of August. This idiopathic reaction was in the present instance doubtless enhanced by the excitement of packing up for a short visit to the country which began on the next day, and removed the subject from observation.

On the whole, we may conclude that *the effect of continued small doses of alcohol is to diminish vital metamorphosis, to make it irregular, and to induce, in healthy people, the necessity for crises of evacuation. Its first action is upon the stomach, enabling more food to be digested, and increasing vitality; but if advantage is not taken of this first action, its secondary effect is a diminution of vital functions in general, and of digestion among their number.*

IV.—These opinions are further supported by the following set of experiments:—

T. K. C., aged forty-three, healthy, though not muscular, of regular life and habits, took daily during the days averaged in the table a quantity of food proportioned to appetite, viz., about a pound and a half of meat, half a pound of bread, a pint and a half of tea, with milk, sugar, butter, sauces &c. *q. s.*, half a pint of water, and from five to seven glasses of port or sherry;* care being always taken not to annoy the temper, and so nullify the experiments, by overstrictness.

	Quantity in cubic centimètres.	Specific gravity.	Urea in grammes.	Chloride of Sodium in grammes.	Sulphuric acid in grammes.	Phosphoric acid in grammes.	Uric acid in grms.
Amount of urine and of its several parts made in 15 days, in perfect health and usual diet	18,800	15·337	493·852	137·655	...	...	...
Ditto in 14 days	...	...	...	...	26·487	27·683	3·839
Mean daily amount ...	1,253	1·022	32·923	9·177	1·891	1·977	·274

The effect of taking in addition at times between meals a

* Which may be reckoned to contain from 33 to 35 per cent. of proof spirit.

moderate amount of alcohol in divided doses is shown in the following table :—

Date.	Quantity in cubic centimètres.	Specific gravity.	Urea in grammes.	Chloride of Sodium in grammes.	Sulphuric acid in grammes.	Phosphoric acid in grammes.	Uric acid in grammes.	Daily quantity of best French brandy taken between meals.
Nov. 16	1,180	1·021	30·090	11·210	1·954	1·770	Trace	3½ fld. ozs.
„ 19	1,800	1·013	28·854	9·900	1·906	1·800	·258	8 „
„ 22	1,150	1·025	32·775	12 075	...	...	...	7½ „
„ 23	980	1·025	27·930	9·310	...	...	...	7½ „
Dec. 3	1,060	1·023	28·620	9·540	1·785	1·696	·339	3 „
„ 5	1,320	1·019	30·875	9·900	1·865	1·980	·330	8 „
„ 6	1,110	1·021	30·025	9·435	1·713	1·665	·299	8 „
„ 17	1,180	1·020	30·208	9·440	1·586	1·652	·343	4 „

It is very clear from these figures that vital metamorphosis, as evidenced by the amount of the principal solids of the urine, is diminished by thus taking more alcohol than the healthy instinct prompts. Not only are the whole mean amounts low, but on no day do they come up to the average. The only exceptions are the chloride of sodium, which is slightly increased, by what agency I cannot tell, and the uric acid, whose augmentation is, probably with justice, considered an indication of an approaching abnormal state.

It may be remarked that a greater quantity of brandy than that recorded above spoilt the appetite and prevented the usual diet being taken with pleasure, thus nullifying the experiments.

I have often given you at the bedside reasons for administering or withholding alcohol in special cases; but I have been cautious about reducing these reasons to general rules without going into the subject more fully than is possible in the wards.

As you are well aware, extreme opinions may be, and have

been, held about this indubitably powerful re-agent. Dr. Brown (the author of the Brunonian theory) persuaded himself that it was a panacea for all human ills, and a direct prolonger of life; but by dint of frequent experimenting, and lecturing with a bottle of brandy by his side, he soon succeeded in giving a practical refutation to his own words by ruining his health and shortening his existence. Others, again, would persuade us that it is a pure poison, whose degree of antagonism to life is in a direct ratio to the quantity used. I shall take for granted that your experience in the hospital has not made you advocates of either opinion; but that you, by this time, have seen, or seemed to see, it in many cases saving and prolonging life, in many saving and prolonging health, in many others destroying and shortening both, and, again, often conceded by indulgent doctors as an innocent luxury likely to do neither good nor harm.

The best guide to the effects to be expected from a re-agent on a diseased body is the intelligent observations of its effects on a healthy body; and I think that alcohol is no exception, but that a knowledge of its physiological action leads directly to its therapeutical application.

The experiments of Rudolf Masing, since repeated and confirmed by MM. Lallemand, Perrin, and Duroy, have taught us that alcohol passes through the body unaltered in chemical constitution, and does not, so far as we know, leave any of its substance behind. It remains in the body for some hours, and during that time exerts an influence for good or for evil.

It is not strictly an "aliment;" but if it aids the appropriation of aliment, it may be looked upon as an "accessory food" in health, and as a "medicine" in disease.

What is the nature of the influence which it exerts? What is its action upon life? It is usually defined as a "stimulus to the nervous system;" and so long as "stimulus" is held to mean only something which makes one feel comfortable, we may be satisfied with the explanation; while upon the nervous system all experimenters, from the first patriarch downwards, will agree that it acts. But if led by the etymology we infer that it directly augments the developed force of the nervous functions, we shall fall into the error of poor Dr. Brown.

Let us be a little more particular in our inquiries, and then I do not think we shall be able to trace any direct increase of force to alcohol, even in the smallest doses, or for the minutest periods of time. The sort of researches of which those detailed are an example, show pretty clearly that its continuous use (*i. e.* in small divided doses) does not add power to vitality, and I think we shall not fail to come to the same conclusion from observations made upon its more immediate effects.

In a series of experiments, conducted with another object, Dr. Edward Smith has recorded very minutely the sensations experienced after brandy, by a temperate man, with a fasting stomach.*

What are the first effects noticed there? Increased life? Increased function? No — lessened consciousness, lessened sensibility to light, to sound, and to touch.

Then there comes a peculiar sensation of stiffness with swelling of the skin, which is noticed particularly in the upper lip and cheeks, evidently due to arrested sensation and motion. These are very unlike spurs to extra exertion.

In a patient lately under my care the same peculiar sensation of stiffness, and also the objective phenomenon of rigidity of skin without loss of sensation, were produced by the pressure of diseased bone on the fifth nerve inside the skull.† If we call this symptom a partial paralysis from partial obliteration of nervous function (to which I suppose nobody will demur), we must call the effects of alcohol also a partial obliteration of nervous function, for the phenomena are strictly identical.

Dr. Smith further records among the "early effects" of alcohol a relaxation of the dartos and other muscles connected with the reproductive system, for which Ovid elegantly, and Shakespeare coarsely, blame the later and more obvious influences of drink. The sphincter also of the bladder was re-

* 'Transactions of Royal Society,' 1859, p. 732.

† In this lady another facial characteristic of incipient drunkenness was simulated. Ordinarily the affected side had a slight diffused fixed colour, the other being pale; but when she blushed the healthy cheek was coloured quickly and deeply, while the diseased one remained unchanged in hue. This is the same physical phenomenon which is exhibited in the half-flushed but unabashed front of a toper.

laxed, and to this the observer lays the increased micturition during indulgence.

The pulse also is quickened. At first blush you might be disposed to view this as an indication of an increase of nervous force. But do not be hasty. Observe with Dr. Bedford Brown the circulation in the cerebrum, during an operation on the skull, when the pulse was quickened by chloroform; and you will see the heaving and bulging of the brain quieted, the surface becoming pale, and the hæmorrhage arrested. The quickening of the pulse must therefore have been contemporaneous with diminished force of the heart's beat.*

Again, observe that in disease those patients especially exhibit the phenomenon of quickened pulse whose hearts are most enfeebled.

No—it would appear that in motion of an entirely involuntary character, quickness indicates diminution and not increase of force.

It is unnecessary to go through the symptoms of advanced intoxication by alcohol: all observations agree that large doses immediately, and small doses more remotely, depress the nervous centres, and that in cases of absolute poisoning the cause of death is cessation of the muscular respiratory movements. What I wish particularly to mark is, that the primary as well as the secondary action is a diminution of vitality in the nervous system.

Life and warmth are so closely connected together in scientific as well as in popular notions that perhaps the most striking evidence of diminished vitality is the lessened capacity to generate heat. We have this evidence in the case of alcohol. MM. Dumeril and Demarquay published in 1848 their observation that intoxicated dogs exhibited a great loss of temperature, and Dr. Boecker and Dr. Hammond find the same result from even moderate doses of spirits. This accords with and explains the experience of Dr. Rae, that alcoholic drinks give no satisfaction to Arctic voyagers, and of Dr. Hayes (Surgeon and Commander in U.S. second Grinnell Expedition), that they actually lessen the power of resisting cold.† The "warming of the stomach"

* 'American Journal of the Medical Sciences,' Oct., 1860.

† Ibid., 1859, p. 117.

which tipplers speak of with delight is in fact a mere fallacy of insensibility to external influences. We may I think fairly come to the conclusion, that alcohol is primarily and essentially a lessener of the power of the nervous system.*

How then can it be a restorative? How can that which lowers one of the chief manifestations of life be a renewer of life?

In this way: in lowering the power of the nervous system, it lowers its action on destructive metamorphosis, and thus it saves the substance of the body. We know that the exercise of nervous functions, bodily or mental, increases destructive metamorphosis. We know, too, that when either bodily or mental action is in excess, there is an arrest of the constructive appropriation of food by the stomach. Our own personal experience, without the aid of Shakespeare, teaches us that passion and emotion as well as over-strained muscular labour put a stop to digestion and appetite. Well then, anything which either sensibly or insensibly interposes between this sensible or insensible nervous action and the digestive viscera must tend to restore that balance of the two in which healthy life consists. Thus Dr. Hammond, having placed himself on an insufficient allowance of food, found his mental and bodily powers deficient—the balance was overthrown. He afterwards took a small quantity of alcohol with each meal, and then, without any increase of diet, he gained weight of body, and his mind was more vigorous. On the other hand, if he added alcohol to a full diet, the blunting of the mental powers was very perceptible, and there was feverishness of body. We cannot doubt that the essential action of the alcohol was identical in both cases, but in the first the blunting of the nerve force was requisite for perfect life, in the second it was not wanted and was therefore injurious.

* We may call it an "anæsthetic," if it is allowed us to extend a little the application of the term, and to let it include all re-agents which tend to interrupt the connection between the material and immaterial of our being, between force and visible nerve, whether our memories are conscious of the interruption or not. It is only when it is taken in considerable doses that our direct feelings note the anæsthetic action of alcohol. Its action on the involuntary nervous system, more important in a physiological point of view, is anterior to that, but can be traced only by inference.

The effect of small wholesome doses upon the mind is to blunt the sensibility to the slight half-felt corporeal pains which the want of balance had produced. It removes the chains of the corruptible body from the soul. Hence a freedom and brightening of the intellect. But it is only the moderate man that can enjoy this luxury; the attempt to drown a care too tall for a shallow bowl, or to soothe a pain too sharp to be forgotten, induces an excess. Then the scale is inclined too much the other way; the influence of the nervous system on the body is *over*-blunted, and the just degree of its action requisite to perfect health is arrested.

In truth this balance is not easy to adjust. And therefore it is lucky for us that alcohol passes so freely out of the body as Dr. Percy, Mr. Masing, and the French physiologists who have repeated their experiments have shown to be the case. It is lucky for us also that any slight harm it may have done during its sojourn is set right by a reaction of increased metamorphosis or evacuation, of which an example has been given in the experiments detailed at the beginning of this lecture.

Thus do I interpret the effects of alcohol; and taking this interpretation as a basis, I would deduce therefrom the following clinical rules for its administration:

I. Give alcohol whenever you find the nervous system is exhausting itself and the body by an activity in excess of the other bodily functions.

Examples:—

In delirious fever, especially in typh-fever. Here the high specific gravity of the urine is a warrant to you of the great amount of destructive metamorphosis going on, and the failing strength shows how low the constructive life is. Continue the alcohol as long as the tongue is dry, and the mind raves instead of sleeping, and the hands tremble.

In pneumonia, in surgical injuries, in erysipelas, &c., under the same regulations. Here, however, our path is not so clear nor so well enlightened by physiology; we must feel our way by actual observation of the effects produced on the patient under our eye.

The power of resistance to some poisons, such as malaria, seems increased by alcohol. Thus anguish and neuralgic cases

in their Protean forms bear well and are benefited by it in very considerable quantities. Strangely enough, these patients on recovery cannot stand it, and usually of their own accord leave off the habit of taking it. So that we need not fear that we shall make them tipplers by administering the remedy.

After violent shocks produced by mental emotion, or extreme bodily labour. It may be doubted whether the prejudice felt against serving out spirits to soldiers or sailors before a battle is justifiable; the courage or apparent strength given may be tinsel, but the power of resistance to wounds, mental and bodily, is something real.

Where the patient has been accustomed to excess. It will not do to let the body have to endure the natural reaction and the disease at the same time. The reaction must be postponed to a more convenient opportunity, when the body is ready for it.

II. Give it, increase it, leave it off under the guidance of the appetite for food. As long as a sick person takes and digests food better with alcohol than without, so long it is doing good. Beyond that we have no evidence.

III. When the marked feature of the disease consists in retention of effete matters which ought to be discharged, abstain from the use of alcohol altogether.

Examples:—

In Uræmia I have always found any effects which could be traced to alcohol to be of an injurious character; under its employment the giddiness, the blunted intellect, the faintings, the tendency to coma, all increase, the urine sometimes becomes more scanty, always of lighter specific gravity; and I cannot say that even the dropsy, for which the alcohol is most usually administered is often benefited.

Jaundice also seems to be aggravated by alcohol.

The uric acid diathesis also presents an objection to the use of alcohol; but there are exceptional complicated cases which appear to receive benefit from occasional doses.

IV. Divide the daily allowance into two or three doses only, giving enough at once to produce a decided effect. The action of frequent small divided drams is illustrated by the experiments I have detailed—it is to produce the greatest amount of

harm of which the alcohol is capable, combined with the least amount of good.

In fever I usually order three doses a day, and find even that division not always advisable, and that the patients do better with two larger doses.

The shape in which alcohol is administered is in many cases not a matter of choice. The mighty force of the purse-strings often restricts us to the coarsest compounds. New whisky and gin and British brandy are better than nothing, but let us not forget that they contain a very hurtful, nay almost poisonous ingredient, foozel-oil, which is abundant in direct proportion to the youth and low price of the article. Age changes this into more wholesome as well as more agreeable ethers. Any of the full-bodied wines are better for acute cases than spirits. Port perhaps exhibits in its commoner varieties more of the good qualities that a wine should have than the produce of other grapes. I mean to say that second- and third-rate port, or even sham port, is a wholesomer beverage than second- and third-rate and sham articles with other names. But if the expense is no object, thoroughly good champagne exhilirates more, is easier digested, and does the good without the harm better than any of its rivals. Of course a high price must be paid for a genuine specimen of a wine so restricted in quantity.

LECTURE LI.

ON BLOODLETTING.

PART I.—*The power of renewal in the animal body exemplified by the quick restoration of normal blood in an anæmic girl—Application of these facts to the artificial anæmia induced by bloodletting—The necessary conditions for the repair of anæmia—Starving and bleeding at the same time bad practice—Reasons for bleeding—Fallacies of the ancients.*

PART II.—*Cases in which loss of blood is beneficial—In some cases of apoplexy—In pneumonia—In the congestions of typh-fever—In serous inflammations, in pleurisy, pericarditis, and peritonitis—In renal congestion and hæmaturia—In paralysis of the circulating organs from over distention—In chronic diseases of the skin—Conclusion.*

(*Clinical, St. Mary's, November 29th,* 1861.)

A FORTNIGHT ago I lectured about an anæmic patient.* She was then showing a title to be no longer so called; and now she most certainly may claim exemption, having fairly won our faith in the statement that her natural hue is rosy. She is leaving the hospital to day with enough hæmatine to colour the blood throughout her body very sufficiently.

Let us take stock of what we may learn from her agreeable change of looks.

What amount of manufacturing industry does this new store of hæmatine prove? Let us do a sum. She weighs 8 stone, or 1792 ounces: of this weight $\frac{2}{7}$ths, or 512 ounces, is blood; and of this blood $\frac{133}{1000}$, or 60 ounces, should be red discs. Now the

* See previous lecture on Anæmia. Lecture XXVII, p. 324.

careful analyses of MM. Andral and Gavarret show that in cases of anæmia of a marked character (as this was), we may expect at least three-quarters of the hæmatine to be wanting; so that when she came into our wards it may be fairly taken for granted that she did not possess above 15 ounces; and now I think with equal fairness her stock may be reckoned to have got up to 45 ounces, which is to allow that she still wants a quarter of her perfect health. By this reckoning she must have made 20 ounces of blood-discs,—so much of the most important organic constituent of upwards of 150 ounces of blood,—in a month!

Mark the vigour of renewal with which the human body is dowered. Learn from this to have faith in its power, and to trust in it, though prospects may look untoward. Learn especially the curability of even the most unfavorable specimen of anæmia. And learn too not only its curability when it is a disease which has come of its own accord, but also the facility of repairing artificial loss of blood when it is employed as a remedy.

I hope you all by this time clearly understand that physiologically speaking all departures from full health are diseases. The artificial states which many of our remedies produce, sometimes even as a means of doing the patient good, but more often as an incident unavoidable and lamented by us, are as much diseases as any of those on the roll of the Registrar-General. Diarrhœa is as much diarrhœa, whether it is caused by epsom-salts, by a felonious poisoner, or by a poisonous malaria. So anæmia is as much anæmia when it follows our lancet and our leeches, as when it arises we cannot tell how, and comes to us for advice. It must be equally thought of, guarded against, and cured, in one case as the other. But what I particularly wish to insist on here is that it is as *easily* thought of, guarded against, and cured in one case as the other.

It has been the fashion lately among certain declaimers to paint the physician who draws a few ounces of blood from the arm, or cups or leeches a sick man, as a sanguinary villain, who necessarily *ex vi termini* takes away the life, or that which he cannot replace. Not only novelists, pill-dealers, and quacks have raised this outcry, but it has been joined in by some whose knowledge of physiology ought to have taught them the fallacy

of the popular notion and the argument by which to refute it. You will clearly perceive from the calculations through which I have taken you that by proper management no loss is easier repaired; and consequently that if it only saves a patient two or three nights' sleeplessness and pain, the price of a venæsection is well paid; and still more, if it contributes in the remotest degree to free him from danger, it is blood well spent.

Nevertheless, note this, that *if the loss is to be repaired, the means of repair must be given.* When I bleed, you will observe that I take down the diet card and suit it to the circumstances, being very careful that the patient has the power to reinvest the capital drawn out. I supply with one hand what I am taking away with the other. I begin to try and cure the anæmia, which I feel myself called upon to produce, at the same moment that I am producing it. "Blowing hot and cold," you will say. Precisely so—that is what I intend. I blow cold with my bleeding, not for the sake of blowing cold, but because it is the inevitable result of the remedy. I blow cold not in order to induce anæmia, but for other quite different purposes which I think are worth the cost. And I blow hot to make up as well as I can for the evil I am going to do, on the principle—

"Facere necesse est sumptum, qui quærit lucrum."

I am sure that the sad effects of the too zealous practice of our fathers, which with justice have been cast in the teeth of the medical profession, were due quite as much to the starvation as to the bleeding. I have a most lively and painful recollection of seeing, when I was a student in Paris, M. Chomel and others treating pneumonia. I could not at first understand why in France so much more marked and more hurtful effects were produced by venæsection than in England. At that period we had at home ample opportunities of seeing it practised; but I never witnessed such prostration follow at St. George's as I did at the Hôtel Dieu. I was puzzled for a week or two, till at last I noticed that the order for "*saignée*" was accompanied by "*diète absolue.*" I almost doubted my knowledge of French, and was obliged to ask of the bystanders before I could believe that this meant an utter deprivation of all food! Here was an immediate explanation of the seeming toughness of my country-

men; for never in our worst days did we carry the Sangrado practice so far as that. Our teachers did not give food enough, but they never bade it to be wilfully kept beyond their patients' reach.

The bad practice of starving and bleeding at the same time, took its rise from the erroneous doctrine of antagonism. According to this theory disease is an enemy to be overcome—A Disease with a proper name and a capital letter to it, like a living concrete creature—a something to be combated by a something which is as opposite to it as possible. Bleeding was found by experience to be useful in certain morbid states; it was, therefore, held to be useful in virtue of possessing qualities opposite to these morbid states. Anæmia and depression of life are the most constant effects of bleeding; therefore anæmia and depression it was argued, are the benefactors to be sought for, and whatever aids bloodletting in producing anæmia and depression is a good companion to it. Of course starvation was the first agent thought of, adopted in all its integrity by the logical French, and with more hesitation by our countrymen, who fortunately do not carry out all arguments to their apparent conclusion, and therefore are often right without knowing why. The abuse has brought about a reaction; and that treatment which was considered at one time so sovereign that its gravest faults were viewed as virtues, now runs a risk of being denied all virtue because of faults capable of being compensated for.

Against this I feel bound to raise my voice. It is time now to have done with the reactions for and against letting blood, which has been going on throughout the period of the Christian era;* the wave, which has swelled backwards and forwards to a

* A short sketch of the reaction in favour of bloodletting started by Galen, is given by the author in the 'Medico-Chirurgical Quarterly Review,' for October, 1858. The shrewd chatty Greek hits hard at his opponents, and seems to have had a single handed fight with all the world of fashion against him, and yet came out victorious in the end. It is satisfactory to find him free from the vulgar notion that human nature and its diseases are liable to changes of type, delivered from the superstition that

Ætas parentum, pejor avis, tulit
Nos nequiores, mox daturos
Progeniem vitiosiorem.

He never suggests that any one generation could stand bleeding either better

dangerous height, ought to settle down into a steady stream. We ought to know clearly *why* we bleed, and then we shall know *when* to bleed.

The question seems to me one to be answered by hydrostatics rather than by physiology. The most important early effect of external injurious action on the tissues is that the blood-vessels lose their tone and become dilated, the "congestive stage of inflammation" occurs. At this conjuncture the more pressure of fluid there is inside, the more will their elasticity be impeded, and the more dilated must they become. Taking blood from them is like emptying the urinary bladder with a catheter when it is paralysed by its retained contents; and the more locally the remedy can be applied, the more like it is to that generally approved surgical operation. Dropping the burden which weighs down their life, the vessels are enabled to go again to their work of regulating the stream of the circulation. So that from this point of view, and so far, the treatment is directly restorative and reconstructive. Bloodletting is a cure of local congestion, and to the local symptoms it may be expected to be beneficial.

The fault of our forefathers was that they went beyond this. They pictured to themselves a condition of universal plethora, or general excess in quantity of blood throughout the blood-vessels—a condition which every observant and practical physician now sees can have no existence in nature.* Where experimentally they saw good results follow the emptying of the blood-vessels, they pronounced the special disease before them to be a proof of this plethora, and hence inferred that the loss of blood was directly beneficial to the system at large by restraining an excess of "violence of life."

We know now that a destructive agency keeps step with the

or worse than their ancestors; but he notices a fact which probably explains a good many of the revolutions of public opinion, namely, that some races are much more affected by it than others—the Keltic, for example, more than the Latin. It would be interesting to trace historically how the prominence of one or other nationality as teachers of medicine has altered the prevailing practice.

* By "plethoric" old writers do not mean "fat," but a state in which too much blood and flesh were supposed to be made by too much nutriment being absorbed. It is the latter or primary meaning of the word, which I refer to in the text.

reconstructive one—that our gain entails a loss. By bloodletting is brought about, temporarily or permanently, first a decrease in those red blood-discs which are the characteristic of health, and then an increased proportion of fibrin which marks disease. So that an injury is done to the mass of the body for the sake of a part—a temporary injury for the sake of a permanent benefit.

The questions, then, which we have to decide in each several case are—first, whether we can by our art certainly repair the artificial injury;—secondly, whether the part to be relieved is of sufficient importance to the whole to justify the sacrifice;—and thirdly, what is the least amount of sacrifice that will be of use.

As to the first question, the daily occurring evidence of such cases as those of which one has formed the text of to-day's hints, is surely enough to give us faith in the means of renewal at our command. As to the second and third, more details are required than we have time for to-day, and I must wait for another opportunity of enlarging upon them.

Part II.—(*Clinical, St. Mary's, March 5th,* 1864.)

Taking for granted that certain evils attend a loss of blood, while certain advantages may also be derived from it, the question is, when does the prospect of advantage overbalance the risk of evil? It is my purpose to-day to set before you a list of certain instances in which it appears to me to do so.

1. *Some cases of apoplexy.*

The cause of apoplexy is obliteration of the cerebral nervous functions. And this may take place in two ways:—

1. By actual destruction of the nervous tissue.
2. By impeded circulation of blood through the brain.

To an inward wound of the nervous tissue, causing actual destruction, whether it take place by violence, by the pressure of a clot of blood or of a tumor, or by the more usual case of atrophic softening, bloodletting can afford no assistance. The immediate effect of the lesion is bad, and the more remote effects worse.

But to the impeded circulation a cure may be surely applied. When from the filling up of the cerebral veins and capillaries with venous blood, black, effete, and useless, room cannot be found for the arterial quickener—when life is stagnant, so to speak, from the stagnation of its river of supply—then you may restore the stream by the rough and ready means of an artificial outlet.

When the lips and tongue are tinted blue with venous blood; when the pulse is filled and sluggish; when the heart, either from chronic lesion or from repletion, has hardly room to strike the ribs; then you may withdraw blood with advantage, for you may relieve the congestion which is obstructing the sanguification of the brain.

When the lips are pale or naturally coloured; when the pulse is free or empty, striking the finger with a high sharp stroke; when the heart beats freely, even if it should murmur in your ear that its valves are imperfect; then the lancet and the leech are useless, nay, hazardous.

The indications afforded by the general symptoms are less positive.

General convulsions may arise from congestion, as often happens in the apoplexy from drowning or hanging, and are not by any means a certain contraindication, as is sometimes stated. It is however as well not to bleed during the paroxysms. But I think that where the convulsion is local, where it occurs in one or two limbs otherwise paralysed, that then it usually arises from local lesion of the nerve substance, and is an argument against drawing blood.

When the apoplexy has, in a previously healthy person, come on gradually, beginning with stupidity, giddiness, and headache without local paralysis, and passing, in times varying from an hour to a day, into complete loss of sense and motion; when the sphincters slowly become relaxed, and continue so; when the patient may by a violent effort be a little roused, lapsing again into unconsciousness; then it is not uncommon to find the symptoms depend on congestion and relievable by bleeding. When it has come on suddenly, a local paralysis being contemporaneous with or preceding the clouding over of the mind; when the sphincters hold their own, or are only intermittent in

relaxation; when the senses which have been suddenly lost are either completely lost, or completely recovered; then you are wiser to abstain, for you probably have to do with broken nervous tissue.

This is about as much as you will have time to think over with your patient before you.

It has been argued by Drs. Munro, Kellie, Abercrombie, and others, that, the brain being enclosed in an unyielding case, and thus excluded from atmospheric pressure, the quantity of blood in it cannot vary, and therefore that detraction of blood from the whole bulk of the fluid in the body can make no impression on it. But the experiments of Dr. Burrows exhibited before the College of Physicians have shown that at least the colour of the brain and the quantity of blood in its veins may be much affected by external circumstances; and that is the point in question; it is the mal-distribution of the blood, the venosity in the brain, that we want to restore to its normal condition, and I feel sure that bleeding may temporarily contribute to that result in the special cases of which I have spoken.

2. *In some cases of pneumonia.*

The reason for bloodletting in pneumonia is shortly stated by the late President of the College of Physicians, when he says, "Although pneumonia is not *cured* by bloodletting, and may be rendered fatal by excess of it, yet a moderate loss of blood early in the disease has sometimes the power of determining favourably both its type and its duration."* That is to say, that though the pneumonia is not cured by the bloodletting, the patient sometimes is. Observe the experiments shown us in the great lecture-theatre of nature. You see that often great relief is experienced when blood is expectorated in the early stages of the disease, that the inflammation ceases to spread over the tissue of the lung as soon as the mucus is stained with red. Get the start of this by prevenient bleeding or cupping or leeches, when the other circumstances on which I enlarge in lectures on special cases of pneumonia allow it. It will diminish the dyspnœa, the oppression and the pain. And you will be quite safe as long as you will bear in mind that you are doing a certain harm at the same time as a certain good, and antici-

* Dr. Mayo in 'British Medical Journal,' May 6, 1863.

pate the harm by proper nutrition, and sustaining the strength of the body.

Observe also the experiments exhibited by nature in localizing the bloodletting. You cannot, as she does, let blood from the bronchial and pulmonic vessels, but you can make the nearest approach in your power by taking it from the exterior of the chest-walls through cupping glasses or leeches.

3. *In the typhous congestive inflammations of the lungs and bowels* taking blood by leeches or cupping from the nearest external surface is often judicious. The relief is usually very rapid and immediate, and the risk run from a small loss of blood very little. The fluid you take away, though called by the common name of blood, is not the same as an equal quantity circulating in the veins of a healthy man. It is more or less poisoned, more or less useless for the purposes of life, and the loss is far from being in a direct ratio to the amount taken. It is more important that the patient should regain the use of his bowels, or of a congested lung, than that he should keep such imperfect stuff circulating or stagnating in his blood-vessels. Of this I have spoken at length in former lectures.

4. The same remarks will apply to *acute dysentery*, in which, indeed, an indication of treatment is afforded by the natural course itself of the disease. The worst cases are those in which there is no loss of blood by stool, and alarming as it is, sanguineous purging often saves the life of the sick.

5. *In inflammations of serous membranes*, such as pleurisy, pericarditis, and peritonitis, a great part of the danger arises from the quickness with which the continuous parts of the same tissue yield to the destructive influences of neighbourhood. This quickness is certainly checked by the direct counteraction which loss of blood affords to the congestive stage of inflammation. The local capillaries show their partial deficiency of life in loss of elasticity, in dilatation, and in being overfilled with blood. Leech the neighbourhood, and you temporarily empty them, and you postpone, at least for a time, the coming inflammation; you gain time; and time is no mean gain, for it gives the smitten body a period of rest in which it can store up force to effect a cure. But it is only time that you gain, for when the first stage of inflammation

is over, when "its work is done, its path of ruin past," then your detraction of blood is a robbery.

As to locality, the nearer you can approach to the part inflamed the better; for the action is hydrostatic, and mechanical forces lose by distance. In peritonitis put your leeches on the painful side of the belly—that is, where congestion is going on, for, after effusion of fibrin or pus, pain ceases at the point of effusion. In pericarditis, apply them close together at the level of the mammæ, or, where the apex of the heart beats, according to where the chief pain on pressure is found to be. In women with full bosoms, shun the mammary gland; not because you will hurt it, but because it removes your leeches too far off. In pleurisy, leech as near the pain as may be; take care, however, to keep above the level of the diaphragm; even although the stitch, as often happens in diaphragmatic pleurisy, should be felt by misplaced sensibility below the ribs. In this case especially you should mark for the nurse the spot where the leeches are to be put on, for you must remember that she is not an anatomist, and has not learned where the pleura ends and begins; she is likely, therefore, to be led into error by the faulty sensations of the patient.

The amount of bloodletting must be proportioned to the risk run by the spread of the inflammation. In peritonitis this is very great and immediate: leech, therefore, freely, and cover the congested spot with the remedy. Two dozen leeches even are not too many in pressing cases. But do not use so many in case of repetition. Then cover the place (having first stopped up the bleeding bites with dry lint) with a linseed poultice, or Markwick's spongio-piline; keep the patient quite still, and procure sleep with opium. Thus you will make the best use of the time gained.

Follow the same rules in pericarditis; only you will not want so many leeches, as there is less space to be covered; six, eight, or at most ten, will be quite enough, according to the size and sex of the patient, and the correspondent size of the exposed piece of pericardium. Moreover, in pericarditis you are more likely to require a second application, as you cannot procure such perfect rest to the heart as to the peritoneal viscera. Poultices and opium, however, are well spent here

Pleurisy, unaccompanied by pneumonia or catarrh, is not such a pressing complaint. Half a dozen leeches and a poultice are usually quite enough to manage it.

6. *Congestion of the kidneys* is apt to produce a continuous drain of blood by the urine; and from the great weakness thus arising, it seems not unlikely that the material thus lost is arterial and vitally important. Moreover, protracted congestion of the kidneys often ends in the permanent degeneration of Bright's disease—a result most unhappy. When, therefore, after scarlatina, exposure to cold, blows, or other causes, I find visible hæmaturia, I almost always cup the patient on the loins. I cannot say that the practice is invariably successful in effecting its intention; for the loins are some way off the kidneys, and the force of the remedy is much diluted by the time it influences the point of attack. But it succeeds often enough in stopping the hæmaturia to make it worth while to lose eight or ten ounces of blood in the trial.

7. The same considerations may sometimes induce us to treat by emission of blood a congestion unimportant in itself, but important from its neighbourhood; such as swelling of the tongue or tonsils, which we fear might suddenly compress the glottis.

8. When the heart is temporarily paralysed by over-distention, either completely, so as to produce apparent death, or partially, so as to produce what is technically known as a "very oppressed pulse," joined with anxiety and dyspnœa, then bleeding and still more cupping the cardiac region is often of signal service. The relief is of course mechanical; the dormant excitability of the heart is roused by the artificial motion communicated to the circulation; and perhaps also the sensitiveness of the nervous system is heightened by the absence of blood, just as tonic muscular contractions are induced by excessive hæmorrhage, by starvation, &c.*

9. Bloodletting may sometimes be employed in chronic skin diseases, to render more efficacious the action of certain specific remedies for certain specific forms. Thus in lepra, and in psoriasis, I have several times arrived at a point at which arsenic and sulphur did no further good, even in doses larger than are

* See M. Chossat's observations, quoted in Lect. II, pp. 21—25.

usually considered safe. After bleeding the patient, a smaller dose produced an immediate effect and a rapid renewal of healthy skin. I have remarked the same fact in a nearly equal degree, as respects the action of alkalies in eczema. Last week I called your attention in the admission-room to the arms and legs of a gardener, as exhibiting quite a typical case of eczema in picturesque distinctness: I had him bled to six ounces, gave him a bran bath and only three doses of liquor potassæ, and next day when we saw him in bed he was so much better that I was obliged to apologise to you for the departure of most of the characteristics of the disease. And last year in a case of extensive lichen no good at all was done by emollient baths of bran and linseed, till I bled the patient, and then these simple agents were sufficient to effect a cure. After these bleedings, if beneficial, no weakness is felt.

These are examples of the principal circumstances under which you will find me in my practice think it advisable to take blood. You will see that they generally agree in this, that there is a want of due circulation, a true deficiency in that important function of the vascular system. The flow of blood restores this circulation, for though the blood flows out of, instead of flowing through the vessels, it is a nearer representation of the living act than the previous stagnation. In all the concerns of organic life, as of social life, anything is better than stagnation.

The physiological reasons for localizing as far as possible our bloodletting are exceedingly well put by Dr. Young. "The effect of venesection must be not only more rapidly, but also more powerfully felt in a neighbouring than in a distant part; and although the mean or permanent tension of the vessels of any part must be the same, from whatever vein the blood may have been drawn, provided that they undergo no local alteration, yet the temporary change, produced by opening a vein in their neighbourhood, may have relieved them so effectually from an excess of pressure, as to allow them to recover their natural

tone, which they could not have done without such a partial exhaustion of the neighbouring vessels."*

The history of opinions on the subject of bloodletting shows us four sects or parties, each one of which has at various times out-weighed its rivals in number of adherents. First, the followers and predecessors (for "*vixere fortes ante Agamemnona*") of Hippocrates, who sometimes bled, but always fed, their patients. Second, the disciples of Erasistratus, who denounced bleeding as robbery, and prescribed in its place a complete starvation for several days—διάτριτος ἀσιτία. Third, the French practitioners of the two last centuries, immortalized but not checked by the satire of Molière and Le Sage, who both bled and starved at once. Fourth, the followers of Brown, who replace bleeding by alcohol.†

From what has been said it will be seen that I should find myself a member of the first-named sect, if the unhappy mania of party spirit were again to afflict our profession as it has done of old. And were hero-worship again to become one of our failings, I should probably select as the Bible of my medical faith Hippocrates' 'Regimen of Acute Diseases.' For if it might be allowed, out of consideration for the differences between Athens and London, to substitute beef-tea for gruel, there is very little in that capital course of lectures which does not accord with the daily practice of those I think wisest amongst us in the present day.

But how different are the grounds on which our practice is based! The Greek had merely the limited guidance of empirical observation, aided in his individual instance by a remarkably shrewd instinctive feeling of what the normal progress of disease is, and how far it is modified by remedies. We have a crowd of anatomical and physiological facts, which may be brought to bear on the subject, and which may keep us from wasting our time in unfruitful experiments; and we have spread open before us

* Croonian Lectures in 'Philosophical Transactions of Royal Society,' 1809.

† I do not here include as a practical school "La Médecine Expectante," which objects to bleeding just so much and no more as it objects to everything else. In an ignorant man this is merely unwarranted scepticism, in a wise man it is a philosophical experiment. Neither can suppose themselves engaged in an act of cure.

in our public hospitals a wide volume for those who will read it aright, illustrating the natural history of disease and its consequences. It is not necessary for any one of us to be an Hippocrates for us to cure disease much more safely than he was able to do, and probably in no remedy is this so clearly shown as in the application of bloodletting.

LECTURE LII.

ANSWERS TO OBJECTIONS AGAINST THE THEORY AND PRACTICE OF CURE BY RENEWAL OF LIFE.

(*Lectori benevolo. Not delivered vivâ voce.*)

He that for the first time happens to hear it made an aphorism of therapeutics (as it has been in the preceding lectures) that morbid phenomena are always evidence of deficient vitality, may not unreasonably find a stumbling-block in the following observations which a thoughtful student of nature will not fail to make on the patients before him :—

First. Morbid excretions and secretions are often more copious than natural.

Second. Morbid solid products may add to the size of the parts they are attached to.

Third. Morbid muscular motions may be excessive.

Fourth. Morbid mental phenomena may be apparently excessive.

Fifth. Morbid temperature is often higher than the normal average.

Sixth. Sensibility is sometimes increased by disease.

I will answer these objections in detail.

First objection. The copiousness of morbid excreta will be observed to depend not on the addition to them of such organized products as are useful in assisting vital processes, but of such as are the result of the physical decomposition of the body, or of its deficient resistance to external cosmical agents. In diarrhœa there is not an extra formation of pepsin or other digestive juices in the alimentary canal, but a flood of liquid resulting from the diminished endosmosis compared with exosmosis—just as you have a flow of water down the waste-

pipe of a cistern when you do not use so much in the house as usual. Thus also, medicines and diseases which increase the amount of hepatic secretion found in the stools, do so by poisoning either the secretion itself or the intestinal absorbents; so that not the quantity made but the quantity wasted is in excess. Waste is no proof of life. Again, in urine abnormally augmented there is found no excess of its essential part, urea, but in almost all cases a deficiency; those instances of apparent excess formerly classed as azoturia, baruria, &c., really resolving themselves into irregular retention and consequently irregular evacuation. The urea is first retained, then thrown out for two days in one. Again, in the bronchi, how can we call excessive mucus an excess of life, when even popular observation takes its superabundance (the "death rattle") as a proof of imminent death? It is not the business of healthy mucous membranes to be covered with mucus at all, and when they are so it is a sign of deficient life, local or general. Mucous globules consist of young epithelium, or rather of matter which ought to have been epithelium, which ought to have lived remaining adherent to the basement membrane, and performed the local duties, but which has miscarried and become a tenacious fluid instead of a continuous solid.*

Second objection,—viz. That morbid products may add to the size of the parts they are attached to.

The fact that diseased parts are often increased in solid bulk is of serious import, and suggests two questions, both of very practical bearing:—

Firstly, does augmented bulk imply augmented general life in the individual?

Secondly, does it imply augmented local life in the part affected?

To the first question a sufficient answer may be found, which a few visits with the eyes open to either medical or surgical wards of a hospital may show to be true; namely, that it is not the burly, full-pulsed, red-blooded man of large appetite and great muscular power that is most liable to exhibit a specimen of solid morbid matter, but the anæmic starveling, quivering at a breeze or a blow.

* See Lectures III, IV, V.

In what corpse do you find the largest weight of fibrin thrown out in the peritoneum in the shortest possible time? In one dead of puerperal fever—that is, in the weaker sex at the period of its greatest weakness.

In whom is rheumatic fever most likely to cause pericarditis, with its great masses of morbid matter? In the young over-grown person, especially if a female, and more especially if an over-worked, under-fed needlewoman or maid-of-all-work.

In whose heart do the consequences of this pericarditis most readily induce hypertrophy? Not in the well-fed and well-clothed idle or professional man or woman; but at the same time of weakness, in the same weakly sex, and under the same weakening circumstances as the original disease came on.

Cancers and other tumours again, are found most often and of quickest growth in the least lively bodies, in the least lively parts, and in those which are half killed by wounds, injuries, or previous disease.

It is perhaps not impossible that, while the general vitality of the individual is lessened, some part might exhibit an extra amount. But morbid processes are not evidences of it: they rather resemble developments of a lower form of life: their products, though abundant, are less vital than the normal growth whose place they take; their existence is temporary, and "they are not capable of becoming permanent constituents of the body, or of lasting as long as the individual."* Examine a patient with thickened heart during life, and the pulse does not strike your finger vigorously, the apex of the organ does not beat sharply against the ribs; indeed, the thicker it gets, the less powerful is both pulse and beat, and the less actively does the blood course through the vessels. Dissect it after death, and you will seldom fail to find a pale tissue with microscopical evidences of commencing fatty degeneration. Still more evident is the same degenerative tendency in cancer. The tissue of malignant tumours, directly it ceases to grow rapidly, begins to decay, to shrink and to be converted into fat. It is hard to imagine local strength or local excess of life producing such a weakling crop.

* Virchow's 'Cellular Pathology,' p. 456.

In cancer, truly, there is a continuous reproduction of new foci of growth, a new progeny of prolific cells, which certainly does look like an extension of local life over a larger space, if not the production of fresh local life. But then we should reflect that the highest and most vital function of nutritive growth is the retention of the form of the body or its separate parts; that in morbid augmentations of size this is lost: the controlling power is absent, and the more so the more morbid and the larger the augmentation is. The formlessness of cancerous and of the so-called hypertrophic tissues seems to refer them to a lower grade of organic life than normal growth.

Third objection.—That morbid muscular motions are often excessive.

It is the function of muscular tissue to contract, and therefore when it contracts oftenest and most it might at the first blush seem to be fullest of life. But on the other hand, its function is to contract in obedience to antecedent animal acts; the voluntary muscles in obedience to the will, the involuntary in obedience to other demands. And moreover it does not seem certain that relaxation is not an active state as well as contraction, for reflex muscular actions, such as winking, yawning, sneezing, laughing, &c., can often be prevented by an effort of the will keeping the muscles relaxed. The highest development of life is the fullest submission of the muscle to its natural master.

Observe, in excessive hæmorrhage, which I suppose nobody will call an exaltation of vitality, there is spasm, convulsion, sometimes epilepsy. In diseases universally acknowledged to be debilitating you find that irregular constant motion called *subsultus tendinum,* and the nearer death, the more marked it is. When the limbs are wearied by violent exercise, they start and quiver, and cramps keep us awake after a hard day's walking. The weaker the will, the more frequent and more violent are hysteric paroxysms. In short, the rule appears to be, that as the debility is greater, the more frequent and more uncontrollable are the muscular contractions, and the easier are they excited.

Fourth objection.—That morbid mental phenomena may be excessive. If we examine carefully the minds of those in

whom one or other mental faculty appears excessive, we find that the apparent excess is due to the deficiency of another faculty, which in the normal state balanced or controlled it. Thus, for instance, the drawings and handwriting of incipient lunatics sometimes exhibit a delicacy and minuteness almost supernatural. This appears to arise from want of imagination and taste. The wonderful memory for little things which these people exhibit is seemingly dependent on the emptiness of their minds of other sensations. That intellect, judgment, poetical or artistic power are ever really developed by insanity, is merely a popular delusion.

Fifth objection.—Life and warmth are so wedded in men's minds, that the heightened temperature in inflammation and fever has contributed more than anything else to beget the idea of the phenomena of disease being due to excess of vital action.

It is true that the heat of the body is greater in fever; but that is no positive proof that more is elicited, only that more is retained, than in health. Indeed, in many cases we can show clearly enough that the quantity produced is *not* augmented. Chill an inflamed part and a healthy part to the same point at the same time, and we find that the healthy part the soonest arrives at the normal temperature. Leave a fevered patient with his burning skin exposed to the air, and he will often grow colder than a healthy person under the like circumstances. Probably a great deal of the heat of fever is due to deficient evaporation by the skin and lungs, and under that aspect would present itself as the direct result of deficient function.

Sixth objection.—When people talk of "hyperæsthesia," and of "sensibility being morbidly increased," they mean that more pain than ordinary is felt in certain parts. I cannot hear that they ever find agreeable sensations augmented. No patient ever speaks of enjoying his morbid feelings; his capacities in this respect are not raised. Nor have I ever found the organs of special sense made really more perceptive by disease. No sounds inaudible to the listening ear ever fall on the invalid's auditory nerve, nor are objects beyond the range of vision pictured on his retina. It is true, that the pains they feel often make them attentive to slight sounds and distant sights, which the by-standers have passed over; but these latter never fail

also to hear and see them by a voluntary direction of the attention.

Nor is common sensation rendered more accurate or delicate. I have tried several times, by the test of its appreciation of the distance between the two points of a pair of compasses, whether a spot inflamed with gout had the perceptive faculties of its nerves heightened in comparison with the corresponding part of the opposite side. I have never found it to be so. I have tried the same experiment on parts affected with hysterical so-called "hyperæsthesia," namely the brow and the left hypochondrium, and the delicacy of touch seemed, if anywise altered, to be lessened.

Therefore to call these pains an increase of sensibility is incorrect.

The increase of painful sensation in disease is of two kinds: first, the exaltation of it in parts which are naturally sensitive; and secondly, its establishment in parts which normally have no feeling. Can either be viewed as an augmentation of life? Test the first by the gradual production of indubitable local death in a part. Burn a portion of skin with fire or a caustic, or produce a slough by pressure;—the entire death or mortification is always preceded by pain. And this pain goes on getting worse and worse the nearer to death the spot approaches, till its sudden sensation at the period of the virtual disconnection of the part with the individual. It seems unreasonable to suppose that the nearer death a part is, the higher should be its life; and we cannot therefore accept heightened capacity for pain as proof of heightened life.

The occurrence of pain during the inflammation of tissues destitute of nerves and insensible under ordinary circumstances, such as the alimentary canal, cartilages, &c., is at first glance an argument telling strongly against the theories of disease and cure which I have propounded. It may be asked whether the sensitiveness of normally insensitive parts can be viewed otherwise than as the extension of a vital function beyond its natural limit and therefore as an increase of life. For where is the pain felt? In the uninjured nervous centre. And where is the nerve that communicates with the centre? Not in the inflamed painful cartilage but at its border. By the disease, by the

lowering of life a physical change is effected in the cartilage up to its edge, and notice of that physical change is transmitted by the nerve.

Since the publication of the second edition I have read expressions of dissent from a principle which I think an important one, and which runs through the whole of my pathological reasoning, namely that all departures from that normal state which renders a man capable of his ordinary duties are diseases. It is argued, for example, by the Professor of Physiology at King's College, that I have no right to class as diseases diarrhœa and diuresis, which may be produced by a medicine in the end beneficial.

A grave principle is here involved.

It seems to me of the utmost importance for the pathologist to recognize that every phenomenon which is not health is disease, and essential to the proper understanding of morbid states to see that the external motive cause makes no difference in their true nature. The state in question is the same whether induced by a physician's drug, or by a felon's poison, or an epidemic malaria, climatic influences, or organic changes in a patient's body. In fact it would obstruct all true progress if we called the state when intentionally produced by one name, and when unintentionally arising by another. In point of fact the world does not do so, and when they are "ill of the doctors" patients call themselves quite as ill as when otherwise laid up.

The words "health" and "disease" must be employed; and if they are employed, the line between them must be drawn somewhere, or each speaker will assign to them a different sense. Where shall we find a line more convenient than that most in accordance with common usage?

An objection has also been raised to my counsel to medical men to turn their thoughts towards adding to rather than to diminishing the materials of growth in disease. The instance of pneumonia has been quoted, where it is said our aim should be to diminish the lymph in the lungs. Now I suppose nothing is so calculated to diminish the materials of lymph as mercury and frequent venæsection; yet mercury and frequent venæsection

are amply proved by experience not to be the most successful means of treating pneumonia. I am sure that the mode of managing the patient by supplying the materials of which lymph is made, as set forth in the lectures on pneumonia, and possibly practised by the objector himself, is much more efficacious.

I trust nobody will understand me to claim any exclusive property of invention in the plans of treatment which I advocate. They are those now adopted by the most earnest and liberal-minded hospital physicians. As Dr. Hayes truly says in the 'American Journal of Medical Science,' I try to "embody into a system the common sense of clinical experience." Perhaps this is a less ambitious task than the building up of theories anticipatory of experiment, but I am sure it is more likely to lead to useful results.

L'ENVOI.

In saying farewell I would take the opportunity of pressing upon students the importance of making physiology the keystone and binding link of all their knowledge, and the firm foundation which they are to crown with their future practice. It is an error, deadly to the usefulness of our profession, to say or do anything to foster an idea that the organic laws of health and disease are different; it is still worse to paint them as in opposition. On the modern principle of dividing labour we have separate lectures on anatomy, physiology, pathology, and the practice of medicine; but your instructors and you should never lose sight of these as branches of one study, as being in truth all limbs of the same tree, those who follow them one after the other are still pursuing the same end—a knowledge of man's nature with a view to the culture of his physical well-being. Each special professor has no more right to claim the sole teaching of you to be medical men, than the shepherd, the weaver, or the tailor can arrogate to himself the credit of adorning our backs.

I have studiously taught you that no new modes of nature's acting are brought into play by disease; its chemistry is the organic chemistry of health; the same mechanical laws are exhibited; the relations of the material and spiritual world therein are the same. The difference consists in the deficiency, that is, the temporary or permanent subtraction, of substance or power, and not in its unwonted increase.

I will frankly grant that this teaching is at issue with certain notions about disease handed down from ancient times, and influencing the practice even of our immediate predecessors.

According to them disease appears in the light of a positive material or agency alien to the body, to cast out which must be our principal aim in our endeavours to restore health.

This idea has several branches. Some look upon the morbid phenomena as "an effort of Nature to destroy some noxious matter, and to recover the patient by expelling it from his body." * It would make the chief business of the physician consist in watching the proper moment for aiding this elimination, in setting it going, or in substituting instead of it an artificial outlet for the "morbific material."

Other branches are the chemical and antidotal systems of treatment, which have nearly the same pathology; they look upon disease as an active foreign substance, which only requires to be rendered inert for the patient to be restored to health. A *materies morbi* is presupposed in either case.

That a few diseases are the result of the introduction into the body, or of the formation in the body, of a foreign noxious agency, may be frankly conceded; and if we could keep this agency out we should keep the patient well. But even in those special cases we cannot but see that the morbid phenomena continue to be displayed after the expulsion of the excitant; the wound remains after the sword is withdrawn, the burn is as painful when the fire is out, the chill is felt after our return to warmth and comfort, the stomach is inflamed though the irritant poison may be neutralized. The disease we have to cure is not the *materies;* but its consequences.

Besides which, this noxious matter is in most instances not foreign to the body at all, but a necessary part of it, only requiring the addition of a fresh constituent, or renewed function, to render it again efficient. Such is acid in the stomach and colon, super-alkaline blood, anasarcous serum in the tissues. To expel them is to deprive the body of its substance, and certainly is injurious practice in most cases.

To another physician the morbid phenomena present a different aspect. He regards them solely as exhibiting a phase of nature different from, and opposed to, normal anatomy and physiology. Disease is to him an active and intelligent living

* Sydenham, ('Obs. Med.,' cap. i,) defines disease to be "Naturæ conamen, materiæ morbificæ exterminationem in ægri salutem omni ope molientis."

foe, at war with his friend the human body, with a military system of its own, to be studied and out-manœuvred. There is a contest between Ormuzd and Ahriman; the agencies under the command of the normal life are arranged against the pathological life.* On these grounds, it would seem the main duty of the medical man to "weaken life," † for it cannot be denied that these pathological phenomena are in a great measure of a vital nature. What this physician fails to recognize, is that their vitality is the deformed remains of the normal vitality, that they are an evidence of deficiency, not something in excess, in fact that disease is "something less than life."

I am sure that physiology as it is now taught in our schools is enough to clear away the remaining mists of these superstitions. They cannot stand before the light. To us now health is that nicely adjusted balance of vital functions which is convenient for the uses men put their bodies to, or *ease;* that disordered balance which is inconvenient is bad health or *dis*-ease. There are no foreign forces to be studied, but simply varied relations arising from deficiency of one or other of the ordinary functions of life, and a consequent want of balance between them.

Is it not, then, obvious that the only sure mode of arriving at a knowledge of the deficiencies of vital powers, or diseases, is by a knowledge of those powers of which they are deficiencies? The physiologist is the only true pathologist.

And as to the use of medicines, with which it is a student's duty to be acquainted, do you not see that the safest guide to a knowledge of their effect upon a disordered body is the knowledge of their effect upon a healthy body, and that the most certain way of advancing the art of healing is to search out the essential actions of physical agents?

To the practitioner I will urge the need of gaining firm faith in the work he is busy upon, and using only the tools he can trust. Without this he can look back with no conscientious joy on his daily toil, his moral nature will become baser and

* "Krankheit ist der Kampf des egoistischen Princips (des besondern Lebens) mit dem planetarischen, der schädlichen Potenz, die es zu zerstören sucht."—Schönlein's 'Allg. Pathologie,' s. 1.

† See Lecture V in this volume, p. 65, note.

baser day by day, he will have but the slighting scorn of those whose praise he should value in old age, and worse than all he will deserve it. The sooner a sceptic leaves our profession the better for his peace of mind.

Remark, that by a sceptic is not meant one who disbelieves what somebody else believes in, and which reason shows to be inconsistent with that which he himself has ascertained to be true. The early Christians were not sceptics, when they rejected the idols which their better faith told them were false gods. Galileo was not a sceptic, when he found the Ptolemaic astronomy inconsistent with his own. A sceptic is one who begins by pulling down, who scornfully calls useless the means which yet he traditionally employs, before he has got better to take their place. Such a turn of mind never has led to truth.

The right-thinking practitioner will, as Sydenham did, gain with advancing experience more faith and confidence in physiological and restorative treatment, will be less driven to fly timidly to destructive expedients. Like that great and honest-minded man he will cease to resort to "*venæ sectio,*" in cases where he has found the effect of "*serum lactis*" sufficient.

To non-professional persons * I would say, examine for yourselves and see that the art of healing is a true work, not a set of rules, not a doctrine, but a real means of adding to life and happiness. See—for you can see if you like—that her foundations are not opinion or traditional notions, but a sure knowledge of God's works. Look and see that not cleverness, or knack, or habit learned from others can be the chief virtues of the professor of this art. There is scope in it for the highest and broadest intellects, for wisdom, prudence, and judgment, as well as for the moralities of perseverance and charity. He in our profession who is first in the scale of humanity is the first and best physician.

I would call upon all to remember what a high matter it is that we take upon ourselves to handle. Man's life!—that which makes him God's viceroy on earth; for divorced dust

* These sentences are taken from a general school introductory lecture given at St. Mary's for the opening of the session in October, 1856; to which, according to usual custom, parents and other non-professional friends of students are admitted.

and spirit cease to hold that lofty post. To aid us in our duty we are dowered with dominion over not only brute matter which we can number and weigh, but over those unseen forces which our reason makes known to us; heat, electricity, vitality, and maybe other yet nameless "Powers of the Lord." Our business is to use them to lengthen and lighten man's earthly trial. Every minute that our ministrant zeal upholds it in vigour fosters a fresh hope of working out salvation for himself and others; every minute by which it is shortened damps that hope.

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